APPENDIX G:

Biological Evaluation
for
Threatened, Endangered, and Sensitive Species
for the
Threatened and Endangered Species Plan Amendment

Monongahela National Forest
West Virginia

Prepared/Reviewed by:

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EXECUTIVE SUMMARY

This Programmatic Biological Evaluation (BE) documents potential effects of implementation of the proposed Threatened and Endangered Species Plan Amendment to the *1986 Monongahela National Forest Land and Resource Management Plan* (hereafter called the *Forest Plan*) on nine federally listed threatened and endangered (T&E) species and 87 R9 Forester's Sensitive Species (4 mammals, 3 birds, 1 reptile, 2 amphibians, 7 fish, 3 mollusks, 26 invertebrates, and 41 plants) that occur on the Monongahela National Forest (MNF). Federally listed species found on the MNF include the bald eagle (*Haliaeetus leucocephalus*), Cheat Mountain salamander (*Plethodon nettingi nettingi*), Indiana bat (Myotis sodalis), Virginia big-eared bat (*Corynorhinus townsendii virginianus*), West Virginia northern flying squirrel (Glaucomys sabrinus fuscus), shale barren rock cress (*Arabis serotina*), Virginia spiraea (*Spiraea virginiana*), running buffalo clover (*Trifolium stoloniferum*), and the Small-whorled pogonia (*Isotria medeoloides*).

Federal agencies are required to comply with provisions of the Endangered Species Act (ESA) of 1973, as amended. This includes a requirement to consult with the US Fish and Wildlife Service on projects that may affect species federally listed as threatened or endangered (TE).

This BE is intended to ensure that management decisions can be made with the most current and state-of-the science information concerning these species. The BE will provide a basis for additional consultation with the USFWS, subsequent *Forest Plan* amendments if needed, and input into future management decisions on the MNF.

The primary focus for this programmatic BE is to document the effects of current and projected management activities on the MNF as identified in the proposed Threatened and Endangered Species Forest Plan Amendment and determine if they comply with requirements of ESA and FS policy. This BE, therefore, will determine whether the proposed action or alternatives are likely to: (1) affect proposed or federally listed species or designated critical habitat; (2) jeopardize the continued existence of species that are proposed for listing; (3) adversely modify proposed critical habitat; or (4) impact Region 9 sensitive species that may occur within the analysis area.

Determinations Of Effects

Threatened and Endangered Species

The following determinations of effects to Threatened and Endangered species have been made as a result of this Biological Evaluation:

Bald eagle (Haliaeetus leucocephalus)
May Affect, Not Likely To Adversely Affect.

Cheat Mountain salamander (Plethodon nettingi nettingi)
May Affect, Not Likely To Adversely Affect.

Virginia big-eared bat (Corynorhinus townsendii virginianus)
May Affect, Not Likely To Adversely Affect. This determination is made for both the VA big-eared bat and its designated critical habitat.

WV northern flying squirrel (Glaucomys sabrinus fuscus)
May Affect, Not Likely To Adversely Affect

Running buffalo clover (Trifolium stoloniferum)
May Affect, Not Likely To Adversely Affect

Shale barren rock cress (Arabis serotina)
May Affect, Not Likely To Adversely Affect.

Small-whorled pogonia (Isotria medeoloides)
May Affect, Not Likely To Adversely Affect.

Virginia spiraea (Spiraea virginiana)
No Effect

Currently there are no species proposed for listing on the MNF or any proposed critical habitat.

Indiana bat (Myotis sodalis)
May Affect, Likely To Adversely Affect. No effects beyond those previously disclosed and addressed in the *Revised Biological Assessment* (USDA 2001) and *Biological Opinion (USFWS 2002)*.

This determination is made for all alternatives that involve large-scale tree removal activities (e.g. timber sales, road construction, minerals, and prescribed fire) for all alternatives. Tree removal forest-wide during the non-hibernation period (April 1 - November 15) may result in mortality (take) of an individual roosting Indiana bat, if a tree that contains a roosting bat is removed intentionally or felled accidentally. If a bat using a roost tree that is removed were not killed during the removal, the roosting bat would be forced to find an alternative tree, potentially expending a significant amount of energy that would result in harm or harassment of the individual. This also constitutes take.

However, all action alternatives fall within the scale and the scope addressed in the USFWS *Biological Opinion* and within the level of take identified in the Incidental Take permit. All action alternatives implement the mandatory *Terms and Conditions*. Consequently, anticipated effects from the action alternatives are similar to those anticipated in the programmatic *Biological Opinion*". Therefore, for the Indiana bat there is a determination of **"No effects beyond those previously disclosed and addressed in the *Revised Biological Assessment* and *Biological Opinion*"**. The *Biological Opinion* concluded that implementation of the *Forest Plan* including the mandatory *Terms and Conditions* of the *Biological Opinion,* was not likely to jeopardize the continued existence of the Indiana bat.
REQUEST FOR FORMAL CONSULTATION – The Monongahela National Forest requests concurrence from USFWS on MNF determinations for the bald eagle, Cheat Mountain salamander, VA big-eared bat, WV northern flying squirrel, running buffalo clover, shale barren rock cress, small-whorled pogonia and VA spiraea. TheForest also requests initiation of formal consultation on the Indiana bat (as required under ESA) under the tiering process described in the *Biological Opinion* (Term and Condition #11) for the proposed Threatened and Endangered Species Plan Amendment.

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USDA Forest Service Regional Forester Sensitive Species (RFSS), Region 9

The following determinations of effects to Region 9 Sensitive Species have been made as a result of this Biological Evaluation:

Given the considerable number and significant biological differences between RFSS found on the MNF, determinations vary in type and degree from alternative to alternative and from species to species. Generally, a no impact, beneficial impacts, or a may impact individuals but not likely to cause a trend to federal listing or a loss of viability determination is anticipated from implementation of any of the alternatives for RFSS. Although the alternatives **May impact individuals, none of the alternatives considered would result in a trend to federal listing or a loss of viability** for any of the RFSS found on the Forest.

Biological Evaluation
for
Threatened, Endangered, and Sensitive Species
for the
Threatened and Endangered Species Plan Amendment

Monongahela National Forest
West Virginia

INTRODUCTION

This Biological Evaluation (BE) is prepared in accordance with direction provided in Section 7 of the Endangered Species Act (ESA)(http://endangered.fws.gov/esa.html) and Forest Service Manual (FSM) 2672.42. The purpose of this document is to determine the effects of the proposed Threatened and Endangered (TE) Species Amendment, and its alternatives, on federally listed or proposed threatened and endangered species, and USDA Forest Service Regional Forester Sensitive Species (RFSS), within the Monongahela National Forest (MNF) of West Virginia.

The need for the Proposed Threatened and Endangered Species Forest Plan Amendment was precipitated by three events: completion of the *Revised Biological Assessment For Threatened And Endangered Species On The Monongahela National Forest, West Virginia* (USDA 2001); a *Biological Opinion* issued by the US Department of the Interior, Fish and Wildlife Service (USFWS 2002) specific to Indiana bat; and an update of the 1990 *Appalachian Northern Flying Squirrels (Glaucomys sabrinus fuscus, Glaucomys sabrinus coloratus) Recovery Plan* (USFWS 2001). The US Department of the Interior, Fish and Wildlife Service (USFWS) provided their *Biological Opinion on the Impacts of Forest Management and Other Activities to the Indiana bat on the MNF* (*Biological Opinion*) to the MNF in March 2002. The USFWS identified Reasonable and Prudent Alternatives, issued an Incidental Take Statement, outlined Reasonable and Prudent Measures, mandated *Terms and Conditions* (T&C), and made Conservation Recommendations. The *Biological Opinion* identified 11 specific actions (*Terms and Conditions*) to minimize the level of incidental take of the Indiana bat. These actions are non-discretionary, and must be undertaken by the MNF so that they become binding conditions of any grant or permit issued… for the exemption of ESA Section 7(o)(2) to apply (any taking that is in compliance with the terms and conditions … shall not be considered to be a prohibited taking of the species concerned). Current MNF Land and Resources Management Plan (*Forest Plan*) direction is that "the requirements of Endangered Species Recovery Plans will be fully coordinated with the Forest Land Management Plan". The USFWS updated the Recovery Plan in September 2001 and identified new "Guidelines for Habitat Identification and Management for *Glaucomys sabrinus fuscus"* which now need to be included into the *Forest Plan*.

The proposed Threatened and Endangered Species Forest Plan Amendment would update the *Forest Plan* to incorporate new information and management guidance for the federally listed Indiana bat and WV northern flying squirrel. The amendment also proposes to update general information regarding other threatened and endangered species in the *Forest Plan*. This BE, therefore, will determine whether the proposed action or alternatives are likely to: (1) affect federally listed species or designated critical habitat; (2) jeopardize the continued existence of species that are proposed for listing; (3) adversely modify proposed critical habitat; or (4) impact Region 9 sensitive species that may occur within the analysis area.

PROJECT DESCRIPTION

A detailed description of the project and the purpose and need for the proposed Threatened and Endangered Species Forest Plan Amendment may be found in the Environmental Assessment (EA) for this proposed Amendment. In summary, new information in the form of 1) USFWS issued *Terms and Conditions*" identified in the USFWS' March 2002 *Biological Opinion on the Impacts of Forest Management and Other Activities to the Indiana Bat on the MNF (Biological Opinion*), 2) new *Guidelines for Habitat Identification and Management* that were adopted into the *Appalachian Northern Flying Squirrels' Recovery Plan (Updated* 2001), and 3) standards that clarify management direction for threatened and endangered species should be incorporated into management direction established in the *Forest Plan*.

A total of four alternatives were developed as a result of issues raised by the public and National Environmental Policy Act (NEPA) requirements. As described in the following alternatives, the Forest proposes to incorporate changes, additions or deletions to "Forest-wide General Direction and Standards and Guidelines", "Management Prescription General Direction and Standards and Guidelines", and Zoological Area General Direction and Standards and Guidelines"; the monitoring section (see Appendix A of the EA); and Appendix K and Appendix X of the *Forest Plan*. Detailed descriptions of the alternatives are found in the EA and are summarized here:

Comment: Check references with Laura

No Action Alternative

This alternative is the existing MNF *Forest Plan*, as amended to date, and is the direction currently guiding management of the MNF. Under this alternative, no amendment would be made at this time, but would be available for consideration in the future. Only those goals, objectives, standards and guidelines currently in the *Forest Plan* would be used to guide management for Indiana bat and other threatened and endangered species. The *Terms and Conditions* defined in the *Biological Opinion* would not be included in the *Forest Plan*, and, therefore, would not be required. This alternative is presented purely to satisfy the NEPA requirement for a No Action alternative as a basis for comparison; as it violates the National Forest Management Act (NFMA) (http://www.fs.fed.us/forum/nepa/nfmalaw.html) and the ESA, it would be illegal to implement.

Proposed Action

This alternative was outlined for the public in February 2001 but has been added to since to address concerns that it did not provide enough specific guidance for threatened and endangered species management. The Proposed Action would incorporate new management guidance for the federally listed Indiana bat and WV northern flying squirrel. It would also address the Forest's desire to clarify existing direction for other federally listed or proposed threatened and endangered species that may occur on the Forest. These changes would further the MNF's efforts to protect, manage, and recover Indiana bats, WV northern flying squirrel, and other threatened or endangered species.

The Proposed Action (like the existing *Forest Plan*) would result in a programmatic decision that would provide a framework for implementing future activities across the MNF. It would not make a decision about a particular action at a defined location; further analysis would be conducted before a site-specific project could be approved and implemented.

The Proposed Action would add, modify, and/or delete **Forest-wide**, **Management Prescription**, and **Zoological Area** standards of the 1986 *Forest Plan* (as amended to date). Various standards would be integrated into the *Forest Plan* that would address pertinent new scientific information about threatened and endangered species. The most noticeable changes that the Proposed Action would make would be in the management of Indiana bat and WV northern flying squirrel habitat. The proposed Action would implement the "*Terms and Conditions*" of the of the USFWS's *Biological Opinion* for the Indiana bat and the new *Guidelines for Habitat Identification and Management* that were adopted into the *Appalachian Northern Flying Squirrels' Recovery Plan (Updated* 2001). The Proposed Action would also create MP 6.3 and associated standards that would provide for protection of swarming areas (five-mile radii around hibernacula) around known Indiana bat hibernacula.

The following **summarizes** the major changes that would be made under the Proposed Action and would affect TE species and their management. Additional information and specific language regarding these proposed changes to the *Forest Plan* for all Alternatives may be found in Appendix A of the Environmental Analysis for the proposed Threatened and Endangered Species Plan Amendment.

Proposed changes related to Indiana bat

- This alternative **incorporates the USFWS-issued *Terms and Conditions* for the Indiana bat found in the *Biological Opinion*** into the *Forest Plan*. It does not incorporate the Conservation Recommendation (EA Appendix A, p. 7-11, #1-11).
- The Proposed Action **includes seasonal restrictions on tree felling for large-scale activities** (e.g. most timber sales, construction of collector and arterial roads, etc.) to reduce the chance of "taking" a roosting Indiana bat. **These activities are prohibited within the primary range between April 1 and November 15.** However, tree felling for small-scale activities (e.g. development of individual gas well pads, construction of local roads, road maintenance, etc.) may be allowed anytime of the year since such smaller disturbances are less likely to "take" a bat (EA Appendix A, p. 15, 32).
- **To protect Indiana bat swarming areas (T&C #1) the Forest proposes to establish management areas (areas of influence = five-mile radii around hibernacula) and prescriptions that emphasize Indiana bat while allowing for activities compatible with Indiana bat management** (EA Appendix A, p. 7, 13-22, 29-38).
- Under the Proposed Action **the area of influence for Indiana bats is divided into four distinct, biologically based areas—maternity colonies and land within two-mile radii, hibernacula and lands within 200 feet, key areas (at least 150 acres of mature or old growth stands near hibernacula), and the primary range (land within five mile radii of Indiana bat hibernacula)** (EA Appendix A, p. 7, 13-14, 29)**.**
  - **Hibernacula, key areas, and land within two miles of maternity colonies of Indiana bats will be managed under <u>Forest-wide</u> and <u>Zoological Area standards</u>** (MP 8.0, Opportunity Area 838) with very specific restrictions and management objectives geared to the protection and recovery of Indiana bats (EA Appendix A, p. 7-10, 13-22).
  - **Under the Proposed Action primary ranges will be managed under <u>Forest-wide</u> and <u>Management Prescription standards</u> (newly created MP 6.3)** with more general restrictions and objectives that place a greater emphasis on Indiana bat management than applies to the general Forest. Proposed standards would restrict certain activities within hibernacula and key areas. **In MP 6.3, the primary purpose of management would be to administer the habitat that Indiana bats are most likely to use as summer roosting and foraging habitat.** Large-scale vegetation management and timber harvesting would be permitted in MP 6.3, but only to improve or enhance Indiana bat habitat, to maintain or enhance natural vegetative communities in a manner compatible with Indiana bat management, or for public safety.
- The Proposed Action would **retain all shagbark hickory trees in cutting units except where public safety concerns exist** (*Biological Opinion T&C #3,* EA Appendix A, p. 3)
- The Proposed Action would **monitor snag retention in cutting units. If an average of less that 6 snags/acre with 9" dbh exists, manually create additional snags** (*Biological Opinion T&C #4,* EA Appendix A, p. 7).
- The Proposed Action would **protect all known roost trees on the MNF until such time as they no longer serve as roost trees (e.g., loss of exfoliating bark or cavities, blown down or decay)** (*Biological Opinion T&C #6,* EA Appendix A, p. 7).

- In order to protect any maternity sites that may be found on the MNF the Proposed Action would provide for the following:

  - **Where evidence of possible maternity colonies (lactating females or juveniles prior to August 15) is discovered, a temporary 3-year, 2-mile radius buffer will be established around the discovery site**. Continue to search for actual maternity colonies within a 2-mile radius of the site through mist netting and radio telemetry for a period of 3 years following the discovery (*Biological Opinion T&C #7,* EA Appendix A, p. 8).

  - **If monitoring activities result in the discovery of maternity sites on the MNF, roost trees used by a maternity colony will be protected by establishing a zone (2-mile radius) centered on the maternity roost site.** The actual area will be determined by a combination of topography, known roost tree locations, proximity of permanent water, and a site-specific evaluation of the habitat characteristics associated with the colony. **Protective measures shall be established by developing a management strategy in cooperation with the USFWS and the WV Division of Natural Resources** (*Biological Opinion T&C #8,* EA Appendix A, p. 8). Under the Proposed Action maternity areas would be managed under **Zoological Area** standards (MP 8.0, Opportunity Area 838) with very specific management objectives. Proposed standards would restrict certain activities near maternity colonies.

- Under the Proposed Action **if any new Indiana bat hibernacula are discovered, the MNF shall develop an appropriate protection plan, which could include signs, fences, or gates** (*Biological Opinion T&C #9,* EA Appendix A, p. 8)

Proposed changes related to WV northern flying squirrel

- The Proposed Action would change standards used for identifying and managing WV northern flying squirrel habitat to make the *Forest Plan* **consistent with the *Appalachian Northern Flying Squirrels' Recovery Plan* (Updated) in September 2001**. (EA Appendix A, pp.5, 11, 42-45).

- Under the Proposed Action **the area of influence for WV northern flying squirrels is recognized as their suitable habitat as defined by the updated *Appalachian Northern Flying Squirrels Recovery Plan*.** Suitable WV northern flying squirrel habitat will be assigned to MP 8.0, Opportunity Area 832.

- **Suitable habitat will be considered as potentially occupied by the WV northern flying squirrel, and emphasis will be placed on protecting this habitat.**

- In addition to certain existing standards, proposed **Forest-wide, Management Prescription** (MP 8.0), and **Zoological Area** (Zoological - OA 832) **standards will be used to manage WV northern flying squirrel populations** (Appendix A of the EA). Standards for the WV northern flying squirrel would comply with the ***Guidelines for Habitat Identification and Management*** incorporated into the *Appalachian Northern Flying Squirrels Recovery Plan (Updated*).

- **Appendix X (Interim Standards and Guidelines, Virginia Northern Flying Squirrel)[*] of the *Forest Plan* would be deleted**. The boundaries of OA 832 WV northern flying squirrel management would be based on suitable habitat as described in the Appalachian Northern Flying Squirrels Recovery Plan (Updated) instead of being defined as lands within ½ mile radius of the confirmed location of the species.

[*] Appendix X, the 1990 *Appalachian Northern Flying Squirrels Recovery Plan* and several other earlier dated documents refer to the species *Glaucomys sabrinus fuscus* as the Virginia northern flying squirrel. Current knowledge indicates that the majority of occurrences and habitats for this species are found in West Virginia (WV). Because of this relative abundance of known occurrences and habitats in West Virginia the USFWS, WV Division of Natural Resources, and MNF have now adopted the common name of WV northern flying squirrel.

- **In suitable habitat**
  - ***Vegetation management will be conducted only (1) to improve or enhance WV northern flying squirrel habitat or (2) for public safety.*** *Commercial timber outputs will be incidental to this principal emphasis.*
  - ***Vegetation management activities may be allowed in suitable habitat to enhance the recovery of the subspecies and/or determine the effects of an activity on WV northern flying squirrel*** if a research permit under the Endangered Species Act section10 is obtained.
  - Vegetation management for the **preservation or enhancement of other threatened and endangered species may be implemented on a limited, case-by-case basis, after consultation with the USFWS.**
  - **Road construction will not normally occur in suitable WV northern flying squirrel habitat.** Limited exceptions to this may be made for research related projects or other projects (e.g. related to gas well development, access to private lands, etc.) approved after consultation with the USFWS.
  - **No new developed facilities** (such as visitor centers and campgrounds) **will be constructed**. Smaller facilities (such as foot trails, trailheads, picnic sites, ¼ acre vistas) may be constructed if compatible with WV northern flying squirrel management.
  - **Special use permits** may be issued if they are compatible with WV northern flying squirrel management.
  - **Development of federal gas** would generally be allowed as long as (1) it remains within the limits projected in the 1991 Environmental Assessment Oil and Gas Leasing and Development and (2) if protection measures for WV northern flying squirrel are developed through consultation with the USFWS prior to Forest Service approval of operations.

Proposed changes related to VA big-eared bat

- **The area of influence for VA big-eared bat will be assigned to MP 8.0, Opportunity Area 837**.
- In addition to certain existing standards, proposed **Forest-wide, Management Prescription** (MP 8.0), and **Zoological Area** (Zoological - OA 837) **standards will be used to manage VA big-eared bat populations** (EA Appendix A pp 25-30).

Proposed general or editorial/administrative changes.

- **The Proposed Action would reorganize and clarify TE information in the *Forest Plan*, and includes additional resource protection and monitoring objectives for TE species.**
- **When activities are proposed in areas with a likelihood of occurrence for listed or proposed threatened and endangered species, the Forest will take one of the following actions**:
  - Redesign the proposed action to avoid the area, or
  - Conduct on-sites surveys, as appropriate, to establish presence or absence of federally listed or proposed threatened and endangered species. If federally listed or proposed threatened and endangered species are not found, the action may proceed; if they are found, actions will be dropped or designed to avoid adverse effects to listed or proposed threatened and endangered species, or
  - Assume potential presence of listed or proposed threatened and endangered species and proceed with action if appropriate mitigation or beneficial measures can be implemented, or
  - In rare instances where adverse effects to listed or proposed threatened and endangered species cannot be avoided, the Forest will consult with the USFWS.

- **Areas of influence will be identified for all listed and proposed threatened and endangered species or populations to assist in their recovery.** All threatened and endangered species' areas of influence will be managed via Forest-wide threatened and endangered species' standards. The areas of influence of the Virginia big-eared bat, Indiana bat and WV northern flying squirrel will also be managed under specific Management Prescription and Zoological Area standards (EA Appendix A, p. 8, #9).

- **Areas of influence will be based on known populations and results of on-site surveys**. They are intended to be dynamic and based on the most current scientific information for a given species (EA Appendix A, p. 5, #10).
- **The Forest will determine and implement appropriate habitat management techniques to maintain or enhance populations of listed or proposed threatened and endangered species.**
- Project analyses will consider, as needed, ways **of minimizing or eliminating threats to listed or proposed threatened and endangered species due to non-native invasive species** (EA Appendix A, p. 5, #12)**.**
- Several proposed changes would be **editorial or administrative in nature** because, in and of themselves, they would not affect resources or the Forest's ability to provide goods and services. **Edits** displayed in Appendix A, pp. 2-7, 10-11, 24, 26-28, 30, 34, 36, and 42-44 are proposed for existing Forest-wide standards to clarify the Forest's responsibilities for various listed or proposed threatened and endangered species and to explain how existing standards or policies should be executed. **Administrative changes** displayed in Appendix A, pp. 2-7, 10-11, 24, 26-28, 30, 34, 36 and 42-44 are proposed to existing Forest-wide standards to clarify the Forest's responsibilities for reporting activities and coordinating with other agencies that may affect various federally listed or proposed threatened and endangered species. Proposed additions or changes are written in such a way to help ensure the *Forest Plan* stays strategic in scope while implementing threatened and endangered species protections.

Examples of proposed standards that are administrative in nature are as follow:

- The official list of threatened, endangered, and proposed species is maintained by the USFWS. Any future changes to the official list will replace the list shown in the *Forest Plan*.
- Each year, report quarterly to the USFWS the cumulative amount of acres involved in tree removal and prescribed burning.
- The Forest Service will participate in the development of recovery plans for all threatened, endangered, and proposed species.
- To ensure that the exemption of incidental take of Indiana bat is appropriately documented, the USFWS will implement a tiered programmatic consultation approach. As individual projects are proposed under the *Forest Plan*, the MNF shall provide project-specific information to the USFWS that (1) describes the proposed action and the specific area to be affected, (2) identifies the species that may be affected, (3) describes the manner in which the proposed action may affect listed species, and the anticipated effects, (4) specifies that the "anticipated effects from the proposed project are similar to those anticipated in the programmatic *Biological Opinion*, (5) a cumulative total of take that has occurred thus far under the tier I *Biological Opinion*, and (6) describes any additional effects, if any, not considered in the tier I consultation.
- Projects on the MNF may proceed without formal consultation if they occur during the hibernation period or if site-specific projects proposed for implementation during the non-hibernation period are surveyed for Indiana bats according to protocols established by the USFWS, and no Indiana bats are detected. When Indiana bats are not detected, it will be assumed that the bats may be present, but in such low numbers that the project is not likely to adversely affect the bat. However, mist netting cannot be used in the area of influence, (five-mile radius of a hibernaculum or within a 2-mile radius of a maternity colony/roost tree or capture site). Projects cleared by mist netting must be completed within three years of the netting. Project acres cleared during the hibernation period or cleared outside of the hibernation period through negative mist net results do not count against the annual allowable acres permitted under the programmatic incidental take statement.

Alternative 1- Proposed Action, No Seasonal Restrictions, Conservation Recommendations

This alternative was developed to meet threatened and endangered species objectives identified in the Purpose and Need while responding to concerns that imposing seasonal restrictions on commercial timber harvesting would result in long-term, adverse effects on the Forest's ability to provide vegetative diversity for wildlife (including the Indiana bat) and timber outputs in a manner that would meet the *Forest Plan* goal for economic efficiency and water quality (*Forest Plan*, pp. 39-40) (see ***EA Appendix A*** for specific changes and **Appendix B** for a map of Alternative 1). Alternative 1 would meet the needs that were identified in Chapter 1 of the EA for the Indiana bat and WV northern flying squirrel. It would also address the Forest's desire to clarify existing direction for other threatened and endangered species.

Proposed changes related to Indiana bat

- Standards and Guidelines and General Direction would be **as described in the Proposed Action except in two ways**:
  - **No seasonal restrictions**. This alternative would allow large-scale tree felling activities within the primary range of Indiana bats any time of the year, as long as project-level analyses deem such activities would be compatible with Indiana bat management and consistent with "*Terms and Conditions*" of the 2002 *Biological Opinion* (Appendix A, pp. 15 and 32).
  - **It would adopt the two, optional "Conservation Recommendations" identified in the USFWS's *Biological Opinion*** (Appendix A, #12 and #13, p. 10).
    - Alternative 1 would encourage the **development of an outreach program specifically about eastern woodland bats species**. (See Recovery Plan task 4.1).
    - Alternative 1 would promote the **retention or creation of small pools of water during road abandonment to** provide drinking water for forest bats.

Proposed changes related to WV northern flying squirrel, A big-eared bat and editorial/administrative changes

Same as Proposed Action

Alternative 2: Proposed Action, Conservation Measures, No Timber Harvesting

Alternative 2 was developed to provide maximum roost tree protection and reduce potential for incidental "taking" of an Indiana bat more than any other alternative (see EA **Appendix A** for specific changes and **Appendix B** for a map of Alternative 2). Like the Proposed Action and Alternative 1, it would meet the needs that were identified in Chapter 1 for the Indiana bat and WV northern flying squirrel. It would also address the Forest's desire to clarify existing direction for other threatened and endangered species.

Proposed changes related to Indiana bat

- **Alternative 2 differs from the Proposed Action in the following ways**:
  - This alternative **incorporates and/or exceeds the USFWS issued *Terms and Conditions* for the Indiana bat found in the *Biological Opinion*** into the *Forest Plan*.
  - Alternative 2 would **incorporate the "Conservation Recommendations"** identified in the USFWS's *Biological Opinion* (Appendix A, #12 and #13, p. 10).
  - Like the Proposed Action **the area of influence for Indiana bats is divided into three distinct, biologically based areas—hibernacula and lands within 200 feet, key areas (at**

least 150 acres of mature or old growth stands near hibernacula), and the primary range (land within five miles of Indiana bat hibernacula).

- **Hibernacula, key areas, and land within two miles of maternity colonies of Indiana bats will be managed under Forest-wide and *Zoological* Area standards** (MP 8.0, Opportunity Area 838) with specific restrictions and management objectives geared to the protection and recovery of Indiana bats. However,

- Under Alternative 2 **the primary range of the Indiana bat will also be managed under Forest-wide and *Zoological* Area standards** (MP 8.0, Opportunity Area 838) with specific restrictions and management objectives geared to the protection and recovery of Indiana bats. (EA Appendix A, pp. 5, 7, and 30)(See Alternative 2 map in Appendix B).

- **MP 6.3 and associated standards would not be created** (EA Appendix A, 13-22).

- It would not impose a seasonal limitation on large-scale tree felling activities (EA Appendix A, p. 35) within key areas and the primary range. However,

- **It would prohibit commercial timber harvests within key areas, within two-mile radii of maternity colonies, and within the primary range of the Indiana bat** (EA Appendix A, p. 32). Non-commercial methods of vegetation management would be used to create a variety of tree species, sizes, and age classes for Indiana bats and other wildlife (Appendix A, p.31).

Proposed changes related to WV northern flying squirrel, A big-eared bat and editorial/administrative changes

Same as Proposed Action

DETERMINATION OF SPECIES AND HABITAT PRESENCE

Federally Listed and Proposed Threatened and Endangered Species

Table 1 summarizes the federally endangered, threatened, and proposed species associated with the MNF, their habitat requirements, and present or historic occurrences. Recent review, through the preparation of a programmatic *Revised Biological Assessment* (BA) of ongoing activities resulting from the continued implementation of the MNF *Forest Plan*, determined what listed species may be present as well as the potential effects to federally listed and proposed threatened or endangered species and their critical habitat. These findings were reviewed by the USFWS and a subsequent *Biological Opinion* was issued (USFWS 2002). More detailed information regarding habitat requirements and occurrences may be found in the *Revised Biological Assessment* and *Biological Opinion*.

Table 1. – Review of federally endangered, threatened, and proposed species for the MNF (USFS 2002).

Species	Habitat Requirements	MNF Occurrences (present or historic)
Bald eagle *Haliaeetus leucocephalus*	Breeding most often occurs within 1 mile of the water bodies that provide the primary food sources (USFWS 1990). Nests are built in super-canopy trees, approximately 100 yards from the nearest forest edge (Cline 1985). Overall, bald eagles prefer areas with limited human activities (Buehler et al. 1991).	Ten active eagle nests exist in WV as of 1999. One nest, discovered in 1987, is in the Smoke Hole area of the MNF, along the South Branch of the Potomac River, in a 6.2 management area. Bald eagle are known to migrate through the Forest.
Cheat Mountain salamander *Plethodon nettingi nettingi*	Cheat Mountain salamander (CMS) survival requires microhabitats with high relative humidities or moisture (Feder 1983, Feder and Pough 1975) and acceptable temperatures. CMS have been found at elevations greater than 2,600 feet MSL. Refugia such as rocks or rotten logs are important for reproduction (Green and Pauley 1987). Vegetative structure also affects salamander populations. Old stands provide dense litter layers, abundant woody debris, and stratified canopies, which all enhance moisture retention (Petranka et al. 1994) and limit moisture and temperature variations in the forest floor.	CMS are geographically restricted to high elevation forests containing a red spruce component (Highton 1971, Pauley and Pauley 1997) and mixed deciduous forests with a Bizzania-dominated forest floor (Pauley and Pauley 1997). Their range is a 700 square mile area exclusively within West Virginia, with ~ 90 percent of the known populations located within the MNF. Seventy-five percent of the known populations have less than 10 individuals (Pauley 1991).
Indiana bat *Myotis sodalis*	For winter habitat, this bat hibernates in limestone caves or mines that satisfy their highly specific needs for cold temperatures during hibernation. During the summer, individuals or maternity colonies roost in trees with cavities or exfoliating bark and forages in riparian and upland forests (USFWS 1996). Swarming entails congregating around hibernacula prior to hibernation, flying into and out of cave entrances from dusk to dawn (Kiser and Elliot 1996). This is a biologically important period because during this time bats mate and replenish fat reserves prior to hibernating (USFWS 1983). Riparian areas provide important foraging habitat and travel corridors. Access to water is essential when bats forage.	Hibernating has been observed in many West Virginia caves, but colonies typically are not large. In most years, approximately 26 West Virginia caves provide adequate winter hibernacula; five of those caves are on the MNF. West Virginia is within Indiana bat's eastern maternity range, but not within its core, and it does not have confirmed maternity colonies.
Virginia big-eared bat *Corynorhinus townsendii virginianus*	They use caves during both summer and winter. These caves typically are located in karst regions dominated by oak-hickory or beech-maple-hemlock associations. Forage in patchy mosaic habitats (USFWS 1984, Stihler pers comm).	Hibernating and maternity colonies have been observed in many West Virginia caves. VA big-eared bats inhabit 30 caves that are within six miles of the MNF proclamation boundary. Six of these caves are on or partly on MNF ownership. Cave Mountain cave and Cave Hollow Arobogast have been designated as Critical Habitat by USFWS.
WV northern flying squirrel *Glaucomys sabrinus fuscus*	This species inhabitats northern hardwood forests that contain a conifer component. Lowest recorded elevation is 2860'(Stihler et al 1995)	Occurrences are associated with higher elevation, red spruce communities. Tucker, Greenbrier, Pocahontas, Randolph, Webster, and Pendleton Counties on the MNF.

Shale barren rock cress *Arabis serotina*	This biennial herb is found mostly on shale barrens of eastern counties of WV (USFWS 1991a).	Grant, Greenbrier, and Pendleton Counties
Virginia spiraea *Spiraea virginiana*	Clonal shrub found on damp, rocky banks of larger high gradient streams. Flood-scoured mouths of side streams, rocky isles, and seasonally flooded side channels, in shrub thickets between the river and forest. Full sun or shade (USFWS 1991b).	One known site on the MNF.
Running buffalo clover *Trifolium stoloniferum*	Perennial clover found on rich, fertile (limestone geology & soils), semi-shaded habitats. Open, savannah-like forests; lightly disturbed areas such as old logging roads. Also old farmsteads and cemeteries (USFWS 1991).	Logging roads on the Fernow Experimental Forest, Swecker Ridge, McGowen Mtn., Cheat Mtn., Shavers Fork (Randolph and Tucker Counties). Also found in Greenbrier and Pendleton Counties.
Small-whorled pogonia *Isotria medeoloides*	Mixed deciduous or mixed-deciduous/coniferous forest in second growth and mature forests on highly acidic fragipan soils with lateral water drainage. Herbaceous cover ranges from none to dense. Common associates include witch hazel, Indian cucumber root, white pine, oaks, hemlock. Occurs in dense shade, as well as near forest edges (USFWS 1992).	Occurs on only one site in WV in Greenbrier County, White Sulphur Ranger District.
Gray wolf *Canis lupus*	Requires large tracts of wild lands in coniferous and mixed northern hardwoods/coniferous forests that have suitable numbers of available wild prey and low human densities.	The MNF is in the historic range of the gray wolf but the last confirmed occurrence of this species was in 1900, and it is considered extirpated from the state (Stihler pers comm 1999).
Eastern cougar *Felis concolor cougar*	Requires large, remote hardwood or mixed forests with an availability of wild prey.	The last confirmed occurrence of Eastern Cougar was 1887. WV DNR and USFWS consider this species extirpated from West Virginia

The MNF and USFWS concluded that implementation of the current *Forest Plan* resulted in a "may effect, likely to adversely effect" conclusion for Indiana bat, which precipitated the need for the proposed amendment. This BE will principally address the effects of this amendment and its alternatives on Indiana bat in the Analysis of Effects section. WV northern flying squirrel will also be given considerable attention due to effects resulting from the *Appalachian Northern Flying Squirrels' Recovery Plan (Updated).* Effects on other TE species will also be reviewed but are expected to remain fairly consistent with earlier determinations found in the *Revised Biological Assessment*.

The USFWS has determined that the Gray wolf is not present on the MNF, having been extirpated from West Virginia. While historic in West Virginia, the Eastern cougar is considered extirpated from the MNF. For these reasons, the MNF concluded and the USFWS concurred that there would be no effect to these species from implementation of the *Forest Plan*. Consequently, we have determined that the original "no effect" determination, contained within the *Revised Biological Assessment* and concurred with by USFWS in the *Biological Opinion*, applies to this *Forest Plan* amendment for Gray wolf and Eastern cougar regardless of the alternative selected. No further discussion for these species is necessary. There is one recent record of gray bat (Myotis grisescens) in West Virginia. This record is of only two bats from a winter bat count in Hellhole cave in 1991. At this time, the species is considered accidental in West Virginia (Stihler pers comm 2000) therefore it will not be analyzed in this BE.

Regional Forester's Sensitive Species (RFSS)

Table 2 identifies the current RFSS for the MNF, including habitat requirements and present or historic occurrences. The RFSS list is designed to identify species for which population viability is a concern, so that management action may be taken to ensure these species do not become threatened or endangered because of Forest Service actions, and to ensure that "viable populations of these species are maintained in habitats distributed throughout their geographic range on National Forest System lands." (FSM 2670.22). The list was recently updated, following the process detailed in a supplement to FSM 2670 (Amendment 2600-2000-1). As all of the current MNF's Region 9 sensitive species are known to occur on the Forest, they have the potential to be affected by the proposed Threatened and Endangered Species Forest Plan Amendment alternatives. Consequently, all of these species will be carried forward into the Analysis of Effects section of the BE.

Recent review, through the preparation of Element Occurrence Reports, Species Risk Assessments, Supplemental Information Reports, RFSS Updates, and project Biological Evaluations of ongoing activities resulting from the continued implementation of the MNF *Forest Plan*, determined which RFSS are known to or likely to be present, as well as the potential effects to RFSS that may occur.

These review efforts also identified species not known or not likely to occur in the MNF and species that are known or likely to occur in the MNF, but which were not listed as RFSS for the MNF because "either (a) their populations and/or habitat appeared to be viable and sustainable on the National Forest in the context of the *Forest Plan* (e.g. Cerulean warbler), or (b) they were represented by either very old or unverified historic records or (c) did not appear to have suitable habitat on or near NFS lands within the MNF proclamation boundary. In addition, other federal and state agencies and private organizations (e.g. USFWS, WV Natural Heritage Program (WV NHP), WV Division of Natural Resources, The Nature Conservancy) or knowledgeable individuals did not consider these species to be at risk within the MNF. As such, actions implementing the *Forest Plan* would have no impact on the viability of these species. Such rationale is still valid in the case of this particular amendment, as there is no new information regarding these species to suggest that changes to the *Forest Plan* would have any unanticipated impact. Consequently, these species are dismissed from further consideration in this BE.

Table 2. Regional Forester's Sensitive Species for the MNF (USFS 2002).

SPECIES	HABITAT REQUIREMENTS	OCCURRENCES (present or historic)
MAMMALS		
Southern Rock Vole *Microtus chrotorrhinus carolinensis*	Moist rocky areas or mossy rocks and logs in spruce & mixed deciduous-coniferous forests, (Wilson and Ruff 1999.) often with birch, other hardwoods & hemlock components. Dense ground cover of mosses, ferns, & northern herbs. Unvegetated talus, grass balds, recent clearcuts, & road-fills. Highly associated with surface or subsurface water (TNC 1992, Kirkland 1999).	Tucker, Randolph, Pendleton, Pocahontas, & Greenbrier Co.
Eastern Small-footed Bat *Myotis leibii*	Hibernates in caves, sometimes under stones or in deep crevices. Summer roosts and maternity sites in buildings, caves, rock crevices, tunnels or under bridges. It is thought that rock outcrops are important for this species. Forages over ponds and streams. Summer habitat may or may not be in proximity to hibernation sites. (TNC 1992b)	Preston, Tucker, Grant, Randolph, Pendleton, Pocahontas, and Greenbrier Co.
Allegheny Woodrat *Neotoma magister*	Extensive rocky areas in deciduous or mixed forests, outcrops, cliffs, talus slopes, caves, river- banks with sandstone rocks and boulders (TNC 1992c.) and buildings (Gleason and Conquist 1991).	Widespread across the Monongahela in rocky areas and around many caves
Appalachian/Southern Water Shrew *Sorex palustris punctulatus*	Found in the vicinity of streams or other bodies of water. Heavy vegetative cover and plentiful logs, rocks, crevices, or other sources of shelter that offer high humidity and overhead protection (Gleason and Conquist 1991). Dominant trees often yellow birch and red maple with dense rhododendron and laurel understory. (TNC 1992d)	Preston, Tucker, Randolph, Pendleton, and Pocahontas Co.
BIRDS		
Northern Goshawk *Accipiter gentilis*	Coniferous, deciduous, & mixed forests; utilizes a variety of forest types, structural conditions, and successional stages. Usually nests in trees greater than 12" DBH. WV is on the southern extent of range. (Brinker 1998, TNC 1992)	Pocahontas, Randolph, Webster, Tucker Counties. They also may be found nesting at elevations above 2500-3000 feet in Grant, Greenbrier, Mineral, Nicholas, and Preston Co.

Peregrine Falcon *Falco peregrinus anatum*	Nest sites on cliffs, prominent high spots, buildings and bridges. Needs isolation from human disturbance. (TNC 1989)	Historic nest sites in Grant, Pendleton, and Greenbrier Co. Known nests found on North Fork Mountain and Gauley Gorge.
Migrant Loggerhead Shrike *Lanius ludovicianus migrans*	Most numerous in dry, open, eastern valleys (Shenandoah Valley). Prefers open farm and pasture, usually perching on scattered trees or wires. Favored nesting site: dense brush, most often with thorn trees (Buckelew and Hall 1994, Hall 1983).	May be found almost any summer in Hampshire, Grant, Pendleton, Greenbrier, and Monroe Co. Rare and local in Nicholas, Pocahontas, Tucker, and Hardy Co. Confirmed nesting in Berkley, Grant, Greenbrier, Monroe, and Mercer Co. (Buckelew and Hall 1994).
REPTILES		
Timber Rattlesnake Crotalus horridus	Rough mountainous terrain where brushy ridges and rocky hillsides with ledges abound. Common in wooded areas, but may occur in valleys, along streams and among slab piles around old sawmill sites. (Brown 1993)	In WV, range extends from the Eastern Panhandle across the Alleghenies south into Mercer and Mingo counties.
AMPHIBIANS		
Green Salamander *Aenides aeneus*	Smaller deeper crevices in rock faces, well-shaded and moist, but not wet, or under bark on trees, rotting logs, etc. Usually below 3000' in northern MNF, below 3500' in southern MNF. (Pauley 1994)	Droop Mtn.; Blackwater Falls State Park; Tucker, Pocahontas, Randolph, Webster, and Nicholas Co.
Hellbender *Cryptobranchus alleghaniensis*	Cool, clear, larger permanent streams. Found throughout the Ohio River drainage. They spend most of their time under flat rocks, emerging at night to forage for food. (Pauley 1994)	Tucker, Randolph, Pocahontas, Webster, Nicholas, and Greenbrier Co.
FISH		
Candy Darter *Etheostoma osburni*	Occupies rocky riffles, appears to be most common in cool to cold sections of moderate to small streams. Widely distributed, locally common endemic of lower New River drainage (Lee et. al. 1980).	Gauley & New River drainages where they are widely distributed in the Cherry and Greenbrier Rivers.
Pearl Dace *Margariscus margarita*	Small, clear, cold streams; often in the vicinity of springs over fine gravel substrates (Lee et. al. 1980); frequently occupies cool bogs and ponds created by beaver dams.	In WV, pearl dace are restricted to the Potomac and Monongahela Rivers and are most abundant in the Shavers Fork of the Cheat River and the two eastern-most tributaries of the Potomac River (Stauffer et al. 1995). This represents the southern extent of their native range east of the Mississippi River (Lee et al. 1980).
New River Shiner *Notropis scabriceps*	Pools or slow runs in small or medium-sized streams, usually over bedrock or gravel substrates.	An endemic species with patchy distribution in the northern tributaries of the New River and definitely located within boundaries of the MNF. Has almost disappeared from the Gauley River drainages, but can still be found in the eastern tributaries. Is still fairly common in the Greenbrier River waters. (Cincotta 2000, Stauffer et. al. 1995)
Cheat Minnow *Rhinichthys bowseri*	Most often found in deep runs over gravel/rubble substrate.	Found only in the Monongahela River drainages of the Ohio River Basin in WV and in waters on the Appalachian Plateau and Allegheny Mt. Provinces.
Appalachian Darter Percina gymnocephala	Pools and runs of mid-sized to large streams and rivers.	New River, Greenbrier and Gauley Rivers, East Fork of the Greenbrier River and Laurel Creek, Gauley drainage (Stauffer et. al. 1995).
Kanawha Minnow *Phenecobius teretulus*	Juveniles and adults typically occupy riffles and runs of gravel, rubble and boulder in cool to warm medium to large streams (Lee et. al. 1980). Apparently has a preference for soft water.	Endemic to New (upper Kanawha) River drainage. Known to occur in the Greenbrier, Gauley, and New Rivers. Potentially in the upper Greenbrier, Williams, and Cherry Rivers.
Redside Dace *Clinostomus elongatus*	Redside dace are associated with small pools or backwater areas in clear, cool streams. They are most often found over gravel or cobble substrates and are not typically found in association with aquatic vegetation (Stauffer et al. 1995).	Redside dace are known to occur in the Monongahela River basin, the upper main channel of the Ohio River, and Middle Grave Creek where their distribution is patchy and uncommon. Native populations of redside dace have not been collected from streams on the Monongahela NF (Stauffer et al. 1995). The closest known populations were sampled from the Blackwater River above the falls (i.e. Canaan Valley) and Laurel Creek in Preston County (Cincotta 2000).
MOLLUSKS		
Elktoe *Alasmidonta marginata*	Streams – more typically smaller streams with swift current in firmly packed fine to course gravel at depths of several inches to 2 feet (Clayton 1996).	Present in Greenbrier River, Cloverlick down through Hosterman to the mouth of the Greenbrier and into the New River.

Organ Cavesnail *Fontigens tartarea*	Caves. Under flat rocks in streams with moderate current (Hosinger et. al. 1976).	Bowden, Bowden/Bear Heaven, Piddling Pit, Dreen, Martha's, Bazzle, Simmons-Mingo, Harper
Green Floater *Lasmigona subviridis*	Fine gravel and sand in backwater and slower water. Patchy occurrence in small to large rivers away from fast current and large boulders.	Currently in Greenbrier River & Clover Creek. Past record from New River drainage. Any Greenbrier River tributary is potential habitat. Two sites on west fork of Greenbrier above Durbin. From Cass south on Greenbrier is good potential habitat (Stihler and Wallace 1997).
INSECTS		
A cave beetle *Pseudanophthalmus fuscus*	Usually near damp or wet places under rocks or rotting wood near cave streams. (Holsinger 2000)	Piddling Pit, Fox, Higginbothams, McClung, Bolling, Blue Springs
Timber Ridge cave beetle *Pseudanophthalmus hadenoecus*	Twilight zone or deeper in caves; on moist soil, often near streams or drip areas. Probably do burrow some; often found under rocks or debris.	Occurs in Mystic Cave, Pendleton Co., Onego Quad (right on Proclamation Boundary) (WV DNR 2000).
A cave beetle *Pseudanophthalmus hypertrichosis*	Damp clay banks in caves. (Holsinger et. al. 1976)	Friels, Tub, Grimes, Linwood, Dreen, Piddling Pit, Martha's, Blue Springs, Bolling, Cass, Martens, Simmons –Mingo, Arbuckle, McClung, Crawford #1Devils Kitchen,
Dry Fork Valley Cave Beetle *Pseudanophthalmus montanus*	Twilight zone or deeper in selected caves, in or on moist soil, often near streams or drip areas, often under rocks or debris.	Known from only four WV caves in Tucker and Randolph Co. The only MNF cave is Cave Hollow/Arbogast Cave, Tucker Co.
Gandy Creek cave springtail *Pseudosinella certa*	Clay banks, damp places on or near organic debris in caves (Holsinger 2000.).	Occurs within 5 miles of the Proclamation Boundary in Stillhouse Cave, Randolph Co., Sinks of Gandy quad
A springtail *Pseudosinella gisini*	Found in damp places on or near bits of organic material in caves (Holsinger 2000.).	The Hole, Grimes, Piddling Pit, Friels, Tub, My Cave,Arbuckle, Friars, Hole, Allison, Buckeye Creek, Fuells Fruit, Higginbothams, Ludington, McClung, Rapps, Clyde Cochrane Sinks
A springtail *Sinella agna*	Damp places in caves on or near bits of organic material (Holsinger 2000).	My Cave, Dreen, Just, Piddling Pit, Harper
Diana Fritillary *Speyeria Diana*	Inhabits mountainous areas in WV; prefers moist and well-shaded forest covers with rich soils; utilizes small openings and roadsides in search of nectar plants but will not stray far from woods; usually found nectaring along woodland edges. Nectar sources: milkweeds, thistles, butterfly weed, wild bergamot, Joe-pye-weed and ironweed. Larval host – woodland violets (Allen 1997).	Found in the southern third of the state, south from lower Pocahontas Co., and west to Kanawha and Lincoln Co.; may also occur occasionally in other surrounding counties, as well as the southern counties, with no records to date (Allen 1997).
Culver's Planarium *Sphalloplana culveri*	In small streams under rocks and pieces of wood in caves (Holsinger 2000).	Within Proclamation Boundary in Harper Cave, Mozark Mt. Quad, Tucker Co.
INVERTEBRATES		
Dry Fork Valley cave pseudoscorpion *Apochthonius paucispinosus*	Damp leaf litter in caves.	Bennett Cave, Mozark Mountain Quad, Tucker Co. (within Proclamation Boundary).
Cheat Valley Cave Isopod *Caecidotea cannulus*	Found under flat rocks in subterranean streams and pools in caves. May also be found in springs flowing out of caves.	Only known to occur in southern Tucker and northern Randolph Counties. MNF caves are Bowden Cave and Cave Hollow/Arbogast Cave
Holsinger's/Greenbrier Valley Cave Isopod *Caecidotea holsingeri*	The most common and widespread troglobitic isopod in WV. In cave stream gravel, under rocks, on decaying wood in streams, and occasionally in drip pools.	Only MNF cave known to harbor the species is Bowden Cave, Randolph Co. Also found in one cave in Virginia and one in Maryland.
An isopod *Caecidotea simonini*	Cave pools.	Stillhouse, Flower Pot
An isopod *Caecidotea sinuncus*.	Under flat rocks in cave streams (Holsinger 2000).	Within Proclamation Boundary, Blowhole, Keel spring, and Mystic Caves, Onego Quad, Pendleton Co. .
An underground crayfish *Cambarus nerterius*	WV's only cave crayfish. Generally in subterranean streams, but small specimens have been collected from dry streambeds (but nearly saturated humidity) (Fitzpatrick 1992, Jezerinac 1995)	My Cave, Matts Black, Buckeye Creek, Ludington, McClungs, Clyde Cochrane Sinks
Hoffmaster's cave flatworm *Macrocotyla hoffmasteri*	In first order and small second order streams of caves (Culver 1994).	Mystic, Piddling Pit, Harper, Levisay, McClung, Bazzle
Greenbrier Valley cave millipede *Pseudotremia fulgida*	Mud/clay banks in caves; sometimes associated with organic debris.	The Hole, Poor Farm, Friels, Overholt Blowing, Piddling Pit, Higginbothams, Allisons, Ludington, McClung, Rapps, Arbuckle, Clyde Cochrane, Sinks, Friars Hole, Durbin, Blue Springs, Martha's, Steam, Hughes Creek
Germany Valley cave millipede	Mud/clay banks in caves; sometimes associated with organic debris (Holsinger 2000).	Seneca Caverns, Hell Hole, Stratoshere Balloon, Schoolhouse

Pseudotremia lusciosa		
South Branch Valley cave millipede *Pseudotremia princeps*	Mud/clay banks in caves; sometimes associated with organic debris (Holsinger 2000).	Peacock, Smokehole, Kenny Simmons, Mystic
Culver's Cave Isopod Stygobromus culveri	Seep and drip pools or in small streams in caves (Holsinger 2000).	Red Run, Stillhouse, Flower Pot
Greenbrier Cave Isopod *Stygobromus emarginatus*	In caves under gravel in streambeds and occasionally in pools. Most abundant in smallest trickles of water. Primarily in tiny first and second order headwater cave streams (Culver 1994, Holsinger 2000).	Bowden, Big Springs, My Cave, Dreen, ClayPit, Sharps, Piddling Pit, Harper, Bonner Pit, The Hole, Levisay, Rapps, Linwood, Martha's, Upper Martha's, Poor Farm, Bazzle, Flower Pot
Pocahontas cave isopod *Stygobromus nanus*	Mud bottoms of small streams and seep pools in caves (Holsinger 2000).	Occurs within Proclamation Boundary in Pocahontas Co., Edray Quad – Piddling Pit Cave.
Minute cave isopod Stygobromus parvus	Found in mud-bottomed, drip and seep pools in caves; tolerant of substrate, but prefers standing water (Fitzpatrick 1993).	Cassell, Piddling Pit, Bonner, Crawford #2
WV Blind Cave Millipede *Trichopetalum krekeleri*	In selected caves, under rocks, around organic debris or on damp silt banks near streams.	Known from only five WV caves. The only MNF cave is Bowden Cave, Randolph Counties.
Grand Caverns Blind Cave Millipede *Trichopetalum weyeriensis*	Damp areas in caves on organic debris (Holsinger 2000).	The Hole, Mystic, My Cave, Linwood, Dreen, Arbuckle, McClung, Higginbothams, Ludington, Kenny Simmons, Cass
Luray Caverns Blind Cave Millipede *Trichopetalum whitei*	Damp areas in caves on or near organic debris (Holsinger 2000).	Hellhole, Stratosphere Balloon, Trout
PLANTS		
Fraser fir *Abies fraseri*	Coniferous tree, generally found above 4500'.	Known from Blister Run, and Beaverdam Run, Randolph Co. According to WV NHP records, is not native to WV. All known sites in WV are planted (Beck 1990).
White Monkshood *Aconitum reclinatum*	Perennial herb found in mesic northern hardwood forests with acidic bedrock, 2500-4000' elev. Common on NE aspects, especially in coves and most often in riparian areas of intermittent and ephemeral streams. In wet but not flooded soil in partial shade, often in a seep at the edge of a road or river where the soil has been worn away (e.g. clay content) by the water moving down the hill. Also along high elevation roads	Gay Knob Area (Edray), Chestnut Ridge (Paddy Knob, Spruce Knob Roadside 112 (Spruce Knob), & sideslope of Laurel Run (Sharp Knob); occurs in Pocohantas, Randolph, Preston, Pendleton, Grant and Tucker Co. . Most commonly on Cateache soils with Mauch Chunk geology.
Arctic bentgrass *Agrostis mertensii*	Open riparian at high elevations. Peaty or rocky soil(Strausbaugh and Core 1977, McDonald pers. comm., Gleason and Conquist 1991).	Known along the upper Shavers Fork above Cheat Bridge on the Mower tract.
Lillydale Onion *Allium oxyphilum*	Odiferous herb with bulb; endemic to acidic shale or sandstone geology mainly on shale barrens	Found in White Sulphur Springs, & Greenbrier, Pendleton, & Grant Co
Spreading Rockcress Arabis patens	Moist, rocky woods, limestone outcrops and shady riverbanks	In the Eastern panhandle; Jordan Run Road, Grant Co.; "Dry Trough" Hampshire Co.; Wardensville, Hardy Co.; and Terrapin Neck, Jeff. Co.
Cooper's Milkvetch Astragalus neglectus	Annual herb found on drier, limestone-based soils in the eastern part of the state.	Only known site is on Cave Mt., Grant Co., in what is considered a prairie extant community.
Lance-leaf Grapefern *Botrychium lanceolatum*	Subarctic and boreal plant of mountain slopes and meadows. Occurs in moist shady woods and margins of swamps (Gleason and Conquist 1991).	Collected in Greenbrier, Pocahontas, Preston, Randolph, and Upshur Co (Strausbaugh and Core 1977).
Harned's Swamp Clintonia Clintonia alleghaniensis	Low herb with umbel, endemic to high elevations of WV and MD above 3500'. Wet inclusions in dry woods or mesic spruce forest. Mt. glades & bogs or swampy woods (particularly where 2 river points come together)(e.g. Warren Run into Gandy Ck.). Riparian areas. Known geology is Pottsville boulders.	Blister Swamp, Old Spruce, Second Fork & First Fork Wetland, Pocahontas Co.; Cranesville Swamp, Preston Co.; Big Draft, Kate's Mtn., White Sulphur Springs, Greenbrier Co.; Hunter Fork Creek, Barber Co.; Norton & Bill Bogg, Randolph Co.; Laurel Fork Wilderness (N&S), Canaan Valley, Yokum Knob, Narrow Ridge and Blue Knob (near Cranberry Glades Bog).
Showy Lady's Slipper Cypripedium reginae	June-Sept. Low, downy, perennial herb occurring in swamps and woods.	Rare in WV, known to occur on MNF only near White Sulphur Springs, Greenbrier Co. (Strausbaugh and Core 1977).
Tall Larkspur *Delphinium exaltatum*	Perennial herb found in open limestone woods, mainly in the mountains in the eastern part of the state.	Found at Smokehole in Pendleton Co., Hardy and Greenbrier Co.

Yellow Buckwheat (Shale Barren Wild Buckwheat) *Eriogonum alleni*	Perennial herb found on the most sterile and barest of sites on shale barrens.	Greenbrier Co.; Ugly Mt., Pendleton Co.
Darlington's Spurge *Euphorbia purpurea*	Annual herb with milky juice found in mountain glades and swampy woods (particularly where 2 river points come together, e.g. where Warner Run flows into Gandy Creek). Possibly mountain bogs, riparian areas. Moist to saturated soils.	Known from Blister Swamp, Pocahontas Co.; Terra Alta, Preston Co.; Laurel Fork, Randolph Co.; Tucker Co.; Canaan Valley, Laurel Fork Wilderness (N&S), McGowan Mt., Cunningham Knob, Yokum Knob, Narrow Ridge, Blue Knob (Cranberry Glades Bog Area).
Box Huckleberry *Gaylussacia brachycera*	Smooth shrub found in acidic sandy soil within submesic forests & on woodland slopes. Under hardwoods, with mixed pine, mt. laurel & other heaths in understory.	Largest population on border of GWNF and MNF in the eastern part of the state. In Greenbrier & Pocahontas Co., North Fork Mt., Redman Run Trail & Smokehole.
Appalachian Oak Fern *Gymnocarpium appalachianum*	Primarily occurs in rocky maple-birch-hemlock woods on mountain slopes and summits, on moist sandstone, talus slopes or bouldery colluvium. Requires a cool, moist microclimate and typically occurs on north-facing slopes with cold air seepage at elevations above 2,000 ft.; occasionally at lower elevations, particularly on the fringes of its range. (Pryer 1997)	Endemic to the Appalachian region, most common in Virginia (the center of its range), where it occurs at 30-100 localities. Pendleton Co.
White Alumroot *Heuchera alba*	Erect perennial herb found in dry, open woods in the eastern part of the state. Found on sandy soils with Tuscarora sandstone (e.g. North Fork Mt.), on rock outcrops within the woods (Gay Knob, Edray Quad) & on rock outcrops on roadside (Rd. 112, Spruce Knob, Pendleton Co.).	Found in higher elevations of North Fork Mt., Grant Co.; Spruce Knob, Pendleton Co.; Crouch Knob, Randolph Co.; Cass, Pocahontas Co.
Crested coralroot *Hexalectris spicata*	July-Aug. A leafless herb occurring in rich woods.	Smoke Hole, Pendleton Co.; Near the northern limit of its range (Strausbaugh and Core 1977).
Long-stalked Holly *Ilex collina*	Deciduous shrub or tree found in riparian areas along high energy streamsides at higher elevations. Moist soil; wet meadows and bogs.	Selected sites on Cheat, Greenbrier and Gauley RDs. Along Gauley and Cranberry Rivers
Butternut *Juglans cinerea*	Deciduous shade-intolerant tree found in rich loamy soils, mixed hardwood forests, shade intolerant, regeneration in open fields, riparian zones, along ridges, or in edge habitat. Found in association with hawthorn on Greenbrier River shoreline in Greenbrier Co	From valley to 3200'. Along streams (Laurel & Shavers Forks), & near the Gay Knob area (USFS Road 201) of Randolph Co.; also found in similar areas in adjacent counties. Also found on Landis Trail of North Fork Mt., Pendleton Co., and in Webster Co.
Thread rush *Juncus filiformis*	June-Aug. Perennial grass-like herb occurring in bogs.	Canaan Valley, elev. 3,000', Tucker Co.; and near Cheat Bridge, Randolph Co. – the southernmost known localities for this species (Strausbaugh and Core 1977).
Highland rush *Juncus trifidus*	Rock crevices and alpine meadows (Gleason and Conquist 1991).	Known only from the rocky cliff tops on North Fork Mountain. Global range is Europe and NE America south to mtns. of Virginia and North Carolina (McDonald pers. comm.).
Turgid Gay Feather *Liatris turgida*	Erect perennial herb in xeric environments associated with clay soils, gravel, shale barrens, & rocky outcrops; can also colonize roadcuts. Occurs in shale barrens in WV. Associates include mt. laurel, black gum, red pine, chestnut oak, & sassafras	Slaty Fork TNC Reserve in Monroe Co. & along roadside (McDowell Co.) White Sulphur Springs, Greenbrier, & Nicholas Co
Large-Flowered Barbara's Buttons *Marshallia grandiflora*	Smooth perennial aster found on sandy or rocky river banks of larger (3rd to 4th order) streams in mountains. Requires hydrology of flood-scouring and full sun, with little competition. Also found in bedrock crevices and sparsely vegetated shores with small stones.	Along the western slopes of Alleghenies. Shaver's Mt., Cheat Mt., Hopkin's Mt., Shaver's Fork, Cherry River, Horse Ridge, Gun Powder Ridge, Huttonsville; Blue Bend (Greenbrier Co.), along lower Gauley River, Nicholas Co.; Cheat River, Preston Co.
Bog Buckbean *Menyanthes.trifoliate*	April-June. Smooth, perennial marsh herb occurring in bogs and marshy places	Backbone Mt., Tucker Co.; Cranberry Glades, Pocahontas Co.; historic site at Cranesville, Preston Co. (Strausbaugh and Core 1977).
Smokehole Bergamot *Monarda fistulosa v. brevis*	Perennial, aromatic herb found only on limestone-derived communities of Cave Mt. ecosystem including the south branch of Potomac sideslopes, cedar glades and rock outcrops	
Canada Mountain Ricegrass *Oryzopsis Canadensis*	June-July. A perennial grass occurring on sandy barrens.	Summit of Panther Knob, Pendleton Co., elev. 4,500', the southernmost station known for the species. (Strausbaugh and Core 1977).
Canby's Mountain Lover *Pachistima canby*	Low evergreen shrub found in dry open woods. Calcareous rocks and slopes in the mountains.	Found only in Potomac and New-Kanawha watersheds in Grant, Pendleton and Greenbrier Co.
Virginia (or Yellow) Nailwort *Paronychia virginica v. virginica*	Perennial mat-like, wiry plant found on limestone-based rocky cliffs, sandstone banks, crevices along riverbanks, & cedar glades.	Cave Mtn., Eagle Rock & Ship Rock in the Smokehole, Pendleton Co.

White Mountain Silverling *Paronychia argyrocoma*	July-Sept. Low perennial herb occurring on White Medina sandstone	New Creek Mt., Grant Co.; Lost River State Park, Hardy Co.; Seneca Rocks, North Fork Mt., Pendleton Co. (Strausbaugh and Core 1977).
Swamp Lousewort Pedicularis lanceolata	Aug.-Oct. Herb occurring in swampy places, often calcareous.	Altona Marsh, Jefferson Co.; Buckeye, Dunmore & Minnehaha Springs, Pocahontas Co.; Sweet Springs, Monroe Co.; near Elkins, Randolph Co. – only known colonies in state. (Strausbaugh and Core 1977).
Swordleaf Phlox Phlox buckleyi	Perennial herb found on shaley slopes in eastern woods. Road banks, open woods.	E. Pocahontas Co. near WV55 and WV39, and in Greenbrier Co.
Jacob's Ladder *Polemonium van- bruntiae*	Perennial herb found in swamps and sphagnous bogs and along riparian zones at higher elevations.	Pocahontas and Preston Co. Southernmost population in Cranberry Glades bog. Also, in Canaan Valley, Tucker Co.
Tennessee Pondweed *Potamogeton tennesseensis*	Aquatic herb found in standing or slow-flowing shallows of rivers.	Greenbrier, Pocahontas, Preston, and Webster Co.
Rock Skullcap Scutellaria saxatilis	May-July. Perennial herb found on wooded rocky hillsides, moist cliffs, 2,500+'; talus slopes/bluffs; moist openings such as riverbanks or talus	Greenbrier, Pocahontas & Tucker Co.
Robust Fire Pink *Silene virginica v. robusta*	Narrow endemic perennial herb in dry open woods or riparian areas of Smokehole Rec. Area. Associated with limestone.	Petersburg Gap in Grant and Pendleton Co
Ammon's Tortula *Tortula ammonsiana*	Moss found on wet, cool rock outcrops on cliff overhangs adjacent to waterfalls. Sandstone walls.	Falls of Hills Creek, Pocahontas Co. (Risk and Kiser 1991).
Bristle Fern *Trichomanes boschianum*	Delicate fern occurring on dripping rocks. The gametophyte will probably be found in deep shaded recesses of sandstone and quartzite rocks. In the Appalachians it is more common and widespread than the sporophyte, but is overlooked because it resembles a filamentous alga.	Kanawha State Forest, Kanawha Co.; Webster Springs, Webster Co. This represents a northeastern extension of the range of this species (Strausbaugh and Core 1977).
Kate's Mountain Clover *Trifolium virginicum*	Perennial, non-stoloniferous clover found on south-facing slopes of very sterile shale barrens and in dry-shaley soils.	Eastern portion of the MNF including: Kate's Mt., Greenbrier Co.; Smokehole (above Big Bend campground); Hardy, Nicholas (Devonian shales), Pendleton Co.
Nodding Pogonia Triphora.trianthophora	Aug.-Sept. Rich woods, infrequent	Short Creek, Fayette Co.; Spring Hill, Kanawha Co.; Mt. Lookout, Nicholas Co.; French Creek, Upshur Co.; and Holly River State Park, Webster Co.(Strausbaugh and Core 1977).
Appalachian Blue Violet *Viola appalachiensis*	Short perennial stoloniferous herb (mat-forming). Moist floodplains of high energy streams, alluvial pond shores, old logging roads, and old mounds of up-rooted cherry trees.	Found on all districts. Grant, Hardy, Nicholas, Pendleton, Pocahontas, Preston, Randolph, Tucker, and Webster Co.
Sand Grape *Vitis rupestris*	Brushy, shrub-like grape found climbing on calcareous or gravelly banks, river bottoms, streambeds, washes, and scoured boulders and cobbles.	Found in Grant, Greenbrier, Pendleton and Preston Co.
Netted Chain Fern *Woodwardia areolata*	Large fern occurring in swamps and wet woods, chiefly in acid soil.	In WV, known only from Clay, Greenbrier, Mineral, Nicholas, Pocahontas, and Upshur counties. Species is distributed principally in the coastal plan and its occurrence in this state suggests that it is a remnant of the Cretaceous flora that occupied the territory prior to the uplift of the Appalachian Plateau (Strausbaugh and Core 1977).

All R9 Forester's Sensitive Species listed above occur on the MNF. Additional habitat requirements for these species may be found in subsequent discussions of effects under the Proposed Action and in the Likelihood of Occurrence Table keep on file in the Supervisors Office. Effects to these species from the proposed Threatened and Endangered Species Amendment to the MNF *Forest Plan* will be considered at the programmatic level.

USFWS has recently received a petition to consider the listing of the cerulean warbler. This warbler is listed as a sensitive species on some Forests within Region 9. However, this species is considered locally common on the Monongahela National Forest. A risk assessment was completed for this species and is available in the MNF Supervisors Office. This risk assessment concluded that there was no need to include the cerulean warbler as a R9 Sensitive Species on the MNF. Consequently, effects to this species will not be analyzed in this BE.

AFFECTED ENVIRONMENT

Discussions of the general affected environment for the MNF can be found in Chapter III of the EA for this proposed amendment.

Federally Listed and Proposed Threatened and Endangered Species

The *Revised Biological Assessment* discusses the affected environment, specific to threaten and endangered species, on the MNF in even greater detail. That programmatic assessment documented the potential effects of continued implementation of the 1986 (as amended) *Forest Plan* on the nine federally listed threatened and endangered species that occur on the MNF. The Forest presented the BA to the USFWS on October 05, 2001. In November 2001, the USFWS notified the MNF that they concurred with MNF's findings of "No Effect" and "May Affect – Not Likely to Adversely Affect" for the bald eagle, Cheat Mountain salamander, VA big-eared bat, WV northern flying squirrel, running buffalo clover, shale barren rock cress, small-whorled pogonia, and VA spiraea (*Revised Biological Assessment*, pp. 2-4 and USFWS correspondence 11/09/2001). The USFWS also concurred with the MNF's findings of "May Affect, Likely to Adversely Affect" for the Indiana bat for all activities that involve tree cutting, and formal consultation on the Indiana bat was entered into as of November 9, 2001. USFWS issued their final *Biological Opinion* and Incidental Take Permit on March 26, 2002. [*]

A brief synopsis, taken from the BA, of the affected environment for TE species on the MNF follows (see Table 1 also.):

Bald eagle - Ten active eagle nests exist in WV as of 1999. One nest, discovered in 1987, is in the Smoke Hole area of the MNF, along the South Branch of the Potomac River, in a 6.2 MP. This nest site, which is in the Chesapeake Bay recovery region, has steep slopes and a closed canopy forest predominated by deciduous trees and some white pines. The nest is well buffered from the river by mature forest and can only be seen from a 0.25-mile stretch of the river

The MNF Smoke Hole area provides good forage and nest habitat. Although the MNF has no large lakes or impoundments, smaller lakes, such as Buffalo Lake, Summit Lake, Spruce Knob Lake, and Lake Sherwood, provide potential habitat. These lakes may be used primarily by non-breeding eagles traveling south from northeastern breeding areas, or north from southern breeding areas (USFWS 1990). Larger river corridors, such as the South Branch of the Potomac, also provide potential nesting and feeding areas.

Cheat Mountain salamander - Cheat Mountain salamander is a relict species of 59 disjunct (Pauley and Pauley 1997) and genetically isolated populations (Kramer et al. 1993). Historically, the range of Cheat Mountain salamander was likely more extensive than it is today.

Known and potential range distributions of Cheat Mountain salamander populations on the MNF have been delineated on USGS topographic maps by Dr. Thomas K. Pauley of Marshall University, the leading authority on the life history and range distribution of the Cheat Mountain salamander.

Cheat Mountain salamander occurs in red spruce forest types (Picea rubens) with a yellow birch (Betula alleghaniensis) component, or in mixed deciduous forest types (Green and Pauley 1987), between 805 m (2641 ft) (Pauley and Pauley 1997) and 1482 m (4860 ft) (Pauley 1999) elevations. Santiago (1999) noted that Cheat Mountain salamander habitat in the Stuart Knob area of the MNF had relative humidities between 92.5 and 99.9 percent.

The extensive logging of spruce around the turn of the century is the most likely cause of decline for this species. Competition from other similar plethodontids, genetic isolation of populations, habitat degradation (e.g., acid deposition), habitat fragmentation, and habitat disturbance all continue to contribute to the limited occurrence of the Cheat Mountain salamander (Pauley 1980,1991).

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[*] Further detailed discussion of life histories of these threatened and endangered species and habitat found on the Monongahela National Forest may be found in the *Revised Biological Assessment*. Additional information specific to the Indiana bat may also be found in the *Biological Opinion on the Impacts of Forest Management and Other Activities to the Indiana bat on the MNF* (*Biological Opinion)* prepared by the Fish and Wildlife Service in March 2002 and in other referenced material.

Indiana bat – Current *Forest Plan* Zoological Area standards for Endangered bats on the MNF (OA 838) provide guidance for management of hibernacula; maternity colonies; land within 200 feet of hibernacula entrances and maternity colonies; and a forested travel corridor 330 feet wide between cave entrances and foraging areas.

Hibernacula: Monitoring indicates that populations are decreasing in portions of their core range (USFWS 1996), but not in WV, where estimated populations have been increasing since the early 1980's (Endangered Species Federal Assistance Performance Reports, WV DNR 1981-2000). Most significant caves are gated or fenced, which has protected populations and likely has been responsible for their increases. In the last decade, WV has seen a 45% increase in the number of hibernating Indiana bat (Wallace pers. comm. 1999). Total numbers of Indiana bat in the state are approximately 10,658 (USFWS 1996). This represents 3% of the entire hibernating population range-wide.

In most years, approximately 26 West Virginia caves provide adequate Indiana bat winter hibernacula; five of those caves are on the MNF. Wintering populations from 1-210 individuals have been recorded in the five MNF caves.

Hellhole, a privately owned cave in Pendleton County, is the only West Virginia cave currently designated Critical Indiana bat Habitat (Priority Two) (USFWS 1996); it lies within the MNF's Proclamation Boundary, but on private land approximately one mile from National Forest land. Use of Hellhole has been on a steady increase for the past 16 years. In 1983-84, this cave wintered only 210 Indiana bat. In March 1999, this cave held 8,548 of the state's estimated 10,658 Indiana bat population.

The majority of West Virginia's known Indiana bat hibernacula are closed to public use. Cave Hollow/Arbogast Cave is gated with a year-round closure order. Two-Lick Run Cave is signed as closed and Big Springs Cave is gated from September 1 to May 15.

Summer Roosting Habitat: While no female Indiana bats or known maternity colonies have been located during the summer within the MNF proclamation boundary, male Indiana bat have been found in the proximity of the hibernacula during this time period. Stihler (1996) found that Indiana bat males foraged and day roosted near hibernacula (within 3.5 miles, or 5.6 km) throughout summer. He observed that Indiana bat males often switched roost trees from day to day, roosting in trees near ridge tops. Based on Stihler's work, a five-mile radius around hibernacula is considered habitat for those Indiana bat that remain around the caves in the summer, mostly males as far as we know and for fall swarming activity for both sexes.

Romme et al. (1995) presents 5 variables that determine roosting habitat (percent canopy cover, mean diameter of overstory trees, density of potential live roost trees >8.7 inches dbh, density of snags >8.7 inches dbh, and percent understory [or understory crown density]) and describes the values of these variables that make the most suitable Indiana bat habitat. The optimal canopy cover for roosting Indiana bat is 60-80%. The abundance of snags indicates current roosting value, so the more snags the better.

Tree structure, specifically the availability of exfoliating bark with roost space underneath, is a critical characteristic for roost trees. Roost site suitability is determined by 1) tree condition (dead vs. living), 2) loose bark availability, 3) solar exposure and relative location to other trees, and 4) spatial relationship to water and foraging areas (USFWS 1999).

Indiana bat have been found to show strong fidelity to roost areas, however individual roost trees are naturally ephemeral, and may be available for a short period of time (Gardner et al. 1991, Humphrey et al. 1977). Tree removal does not discourage Indiana bat from using dead trees nearby as roosts; and in fact may make them more attractive by allowing more warming by solar radiation (USFWS 1999). Indiana bat use isolated trees in openings as roost trees (Kurta et al, 1993), and they may switch between shaded and unshaded roost trees depending on weather conditions (Callahan et al, 1997; Kurta et al, 1996) and physiological requirements associated with thermal regulation.

Potential roosting habitat, both maternity and nonmaternity, is widely available on the Forest because the MNF is 97% forested with 81% of the forest over 60 years old. About 7% of the forest is over 105 years old. Given the average growth rates on the MNF, the stands that are over 60 years old, most likely have a mean diameter of around 11 inches DBH, well over 8.7 inches, needed for quality roosting habitat. Trees exhibiting roosting characteristics, such as shagbark and bitternut hickory, red and white oak, sugar maple, white and green ash, and sassafras, are plentiful throughout the Forest. Snag abundance will not reach optimum levels on the MNF for several years, when the trees begin reaching the end of their life span. Mature forests have been commercially thinned, regenerated, or selectively harvested to create the more open forest canopies that provide quality habitat for Indiana bats (USDA 2001). Standing dead trees and large, overmature trees which Indiana bats may use as roost trees are abundant across the forest.

Indiana bat maternity roosts: West Virginia is within Indiana bat's eastern maternity range, but not within its core, and does not have confirmed maternity colonies. Despite extensive summer surveys throughout West Virginia, especially in and around the MNF (BA Appendix 6), Indiana bat maternity roosts have not been found. Presumably, reproductive female bats are more constrained by thermoregulatory and energy needs than are males and nonreproductive females (Cryan 2000). MNF nighttime temperatures on most of the Forest are thought to be too cold to support maternity colonies (Stihler and Tolin, pers. comm. 1999).

Summer Foraging Habitat: Indiana bat forage nightly for terrestrial moths and aquatic insects, primarily in upland forests and riparian woodlands. Indiana bat prefer to forage within upper forest canopy layers where overstory canopy cover ranges from 50-70%. Indiana bat are also known to forage along forest edges, in early successional areas, and along strips of trees extending into more open habitat, but drinking water must be available near foraging areas (Romme et. al. 1995). Potential foraging habitat is widely available on the MNF. Large open pastures or croplands, large areas with <10% canopy cover, and stands with large unbroken expanses of young (2-5-in dbh), even-aged forests are avoided or are rarely used for Indiana bat foraging (Romme et al. 1995) (MacGregor 1999). .

Fall Swarming Habitat: Indiana bat begin swarming as early as August and through October or November, depending upon local weather conditions. Swarming entails congregating around hibernacula prior to hibernation, flying into and out of cave entrances from dusk to dawn (Kiser and Elliot 1996). This is a biologically important period because during this time bats mate and replenish fat reserves prior to hibernating (USFWS 1983). The MNF provides approximately 252,000 acres of swarming habitat within five miles of known hibernacula, most of which is forested. Of these acres approximately 56,000 acres are in Wilderness (MP 5.0), semi-primitive, largely natural, undisturbed areas (MP 6.2) and zoological areas (MP 8.0) that provide sufficient protections to the Indiana bat. Approximately 583,000 acres of private lands fall within five miles of known hibernacula.

Radio telemetry studies conducted near Big Springs Cave on the Fernow Experimental Forest (located within the MNF) (Stihler 1996) provide local data about roost trees and foraging habitats used by Indiana bat during fall swarming. Indiana bats appeared to forage primarily in wooded habitats including riparian zones. Roosts were usually in dead trees, dead portions of live trees, or in live shagbark hickories. Some species that were used as day roosts during this study were, larger-diameter (>10 inches dbh) black cherry, shagbark hickory, slippery elm, white ash, and yellow poplar trees.

Virginia big-eared bat - Current *Forest Plan Zoological* Area standards (zoological OA 837[*]) provide guidance for management of hibernacula; maternity colonies; land within 200 feet of these inhabited caves; and a forested travel corridor 330 feet wide between cave entrances and foraging areas.[**]

VA big-eared bat is a geographically isolated and sporadically distributed cave obligate species. West Virginia holds its largest populations, particularly Pendleton County (Barbour and Davis 1969). West Virginia's Cave Mountain Cave, Hellhole, Hoffman School Cave, Sinnit Cave, and Cave Hollow/Arbogast Cave are designated as "Critical Habitat" for this species based on the precise physical structure, temperature, and humidity conditions required for its continued survival, as well as the significant number of VA big-eared bat that occur there. Cave Mountain and Cave Hollow/Arbogast are on the MNF.

Hibernacula and Maternity colonies: Cave-dwelling bats are particularly at risk due to human disturbances. Cave Hollow/Arbogast Cave is the largest maternity colony sites on the MNF, and is also a hibernaculum. As designated Critical Habitat by the USFWS, it is closed year round to public entry. Cave gates were installed on 4 known Forest Service entrances and 1 private entrance to this cave system in 1996. Cave Mountain, also designated as Critical Habitat, is used as a maternity colony site. It is closed to the public from April 1 through September 1, and opened in winter. Rebar style gate closures were replaced in 1995 with angle-iron gates. Peacock Cave is a VA big-eared bat hibernaculum and maternity cave. It is isolated and signed for year-round closure. The entrance is extremely small and currently not gated. Gating would be a last resort since gate installation could affect airflow and microclimate at such a small entrance. WV DNR data have indicated no population problems from human disturbance in this cave. In fact, maternity colony populations have increased since 1983.

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[*] Proposed designation.

[**] Zoological standards for BA big-eared bats (OA 837) standards are identical to existing Indiana bat (OA 838) standards.

The habitat surrounding the VA big-eared bat caves on the MNF is very diverse - the majority is in private ownership and agricultural use. Other known land uses in this area are timber harvesting, strip mining, limestone/rock quarries, two commercial caves, as well as Canaan Valley State Park, Blackwater Falls State Park, Canaan Valley Wildlife Refuge. The National Forest land around VA big-eared bat caves is all forested with the exception of a very small percentage of wildlife openings and several range allotments. The majority of the forested acres are over 60 years old.

Summer Foraging: VA big-eared bat feed predominantly on moths (Dalton et al. 1986, Sample and Whitmore 1993). Based on local research, VA big-eared bats travel up to 6 miles from their caves to forage (Stihler 1995). Recent clearcuts and grazed land were not used. One radio-tagged bat traveled directly from the cave to unmowed hayfields where it foraged for about 2 hours, after which it night roosted for another 1-2 hours. Following night roosting, the bat spent most of its time in wooded areas, especially a small wooded ravine west of the hayfields. The study was continued in late July 1992, and while foraging occurred in both wooded and open habitats, wooded habitats were used more than in 1991. During both studies, bats rarely returned to the cave during the night, even in July when females had young remaining in the cave (Stihler 1994). Timber harvesting, water quality degradation, stream channelization, and other actions potentially could alter foraging habitat in some cases (Grindal 1996).

WV northern flying squirrel - Prior to completion of the Recovery Plan in 1990, WV northern flying squirrel management on the MNF was conducted in accordance with the 1986 *Forest Plan* Forest-wide Standards and Guidelines, and more specifically Appendix X, *Interim Standards For the Virginia Northern Flying Squirrel* (*Forest Plan*, pp. 87, 198-204, 234, and Appendix X). The 1990 Recovery Plan incorporated the guidelines from *Appendix X* of the *Forest Plan* with slight changes into it's *Appendix A*, *Suggested Guidelines for Habitat Identification and Management.* Once finalized, the 1990 Recovery provided the primary direction for management of the WV northern flying squirrel on all non-Federal and Federal lands, including the MNF. Appendix X of the *Forest Plan provided additional guidance for management of MNF lands.*

Both the 1990 *Recovery Plan* and the 1986 *Forest Plan* guidelines describe "occupied" habitat as any area where the WV northern flying squirrel is known to exist through positive identification such as through trapping. The size of the occupied area was defined as all areas within ½ mile of the trapping or identification site *(regardless of the habitat characteristics of the surrounding area).* Because this area is based solely on the proximity to a capture site for WV northern flying squirrels, this ½ mile radius may incorporate and protect habitat that is both "suitable" and "unsuitable" (e.g. areas that would not support WV northern flying squirrels because few or none of the habitat elements required by the species were present) (USFWS 2001). The 1990 *Recovery Plan* and *Forest Plan* guidelines further defined "potentially occupied habitat" for the WV northern flying squirrel as: 1) all stands containing spruce or fir, or 2) all stands above 3300 feet containing hemlock or northern hardwoods in any combination, and 3) stands with at least some 10-inch diameter at breast height or larger trees present and at least partial canopy closure (e.g., in mixed conifer/hardwood stands with a minimum basal area of 100 square feet per acre).

To ensure protection of WV northern flying squirrels, the MNF has either avoided implementing activities in potentially occupied habitat or identified occupied habitat by conducting surveys for WV northern flying squirrels within potentially occupied habitat (*Forest Plan,* Appendix X). Based on definitions identified in Appendix X, potentially occupied habitat is estimated to be in excess of 100,000 acres. To date, only a part of the potentially occupied habitat on the MNF has been surveyed for WV northern flying squirrels. From these surveys, ~72,000 acres have been identified as "occupied" habitat: ~12,000 acres in Wilderness (MP 5.0) and semi-primitive, non-motorized recreation areas (MP 6.2); and ~60,000 in (MP 8.0 – OA832).

The MNF contains greater than 90% of the known habitat within WV northern flying squirrel range. A small amount of habitat (one to two percent) is located in Virginia on Allegheny Mountain, which is adjacent to the MNF on the George Washington/Jefferson National Forest. This area, known as the Laurel Fork Area, is considered a semi-wilderness/backcountry area.

Northern flying squirrels have been captured in stands of various ages, understories, densities, and species composition, but most have been in moist forests with some widely-spaced, mature trees, abundant standing and downed snags (USFWS 1990), usually with some conifer (spruce, hemlock, fir) present (Stihler, 1994). These habitats seem well suited to WV northern flying squirrel' gliding locomotion, cavity nest requirements, and reliance on wood-borne fungi and lichens for food (USFWS 1990). In the southern Appalachians, WV northern flying squirrel commonly are captured in and apparently prefer conifer/hardwood ecotones or mosaics dominated by red spruce and fir with hemlock, beech, yellow birch, sugar maple or red maple, and black cherry associates. At one time understory components were not thought to be significant indicators of general northern flying squirrel habitat (USFWS 1990; Payne et al.,

1989). However recent data indicates that WV northern flying squirrel have been captured in northern hardwoods with conifer in the understory (Stihler et al 1995), indicating understory composition may play a greater role as a habitat indicator for this subspecies than previously thought.

As of 2001, over 1,000 WV northern flying squirrels have been captured, including a small number of recaptures, in West Virginia in the same general six-county area. In addition, a total of ten specimens of the VVVNFS have been captured on the Allegheny Mountain just over the West Virginia state line in Highland County, Virginia, primarily on the George Washington/Jefferson National Forest (USFWS 2001); 97% of these captures have occurred on MNF lands. The minimum elevation at which the WV northern flying squirrel was known to occur, originally set at 3,300 feet above mean sea level (MSL), has changed. The WV northern flying squirrel is now known to occupy mixed northern hardwood/hemlock stands at approximately 2,640 feet MSL. Elevation is only one indicator - local climate, soil, and aspect are also strong influences on the presence and maintenance of the preferred habitat (USFWS 2001). Capture areas with no overstory red spruce had overstory eastern hemlock or balsam fir, with red spruce usually present nearby (Stihler et. al. 1995, Odom et al. 2001).

It is very likely WV northern flying squirrels occupy additional habitat on the MNF beyond what is currently identified as "occupied". Under the No Action if all potentially suitable habitat as defined in Appendix X or in the *1990 Appalachian Northern Flying Squirrels' Recovery Plan* were surveyed, substantially more acres (>100,000 acres in addition to the current ~72,000 acres) may be confirmed to be "occupied" (and, therefore, protected). Under the No Action this also results in some cases in classifying a considerable number of acres as protected based solely on proximity to a capture site, even when few or none of the habitat elements required by WV northern flying squirrel are present.

In their November 2001 correspondence, the USFWS concurred with MNF personnel's findings that continued implementation of the *Forest Plan* resulted in either a **No Effect** or **May Effect, but was Not Likely to Adversely Effect** WV northern flying squirrels. USFWS's concurrence was contingent on the MNF working collaboratively with them to (1) produce a map of suitable habitat for WV northern flying squirrels prior to implementing any site-specific activities that could adversely affect suitable habitat, and (2) reviewing the map periodically and refining it collaboratively with the USFWS and the WV Division of Natural Resources (WV DNR). This determination lead the Forest to propose deleting interim standards in Appendix X, and also changing WV northern flying squirrel OA 832 standards to make them more consistent with the *Appalachian Northern Flying Squirrels' Recovery Plan (Updated).*

Shale Barren Rock Cress - Mid-Appalachian shale barrens generally are characterized by open (<10% canopy closure), scrubby pine (*Pinus* spp.), oak (*Quercus* spp.), red cedar (*Juniperus virginiana*), and woody species growing on dry, south-facing steeply-sloping (>20%) shale formations. Open herbaceous cover adapted to this harsh environment also can occur (USFWS 1991). Often the slope is undercut by a stream directly below the shale barren. In the mid-Appalachians, the shale formations are generally upper Devonian-age, though some are Ordivician- and Silurian-age (USFWS 1991). Shale barrens are south- to southwest-facing, narrowly endemic sites on shale ridge balds. They exist on Devonian-age shales of the Brallier formation between 1300-2500 ft (396-762 m) elevations (Keener 1983).

Nine shale barren rock cress sites are known on the MNF: Lower White's Draft (2 small barrens), Meadow Creek, Middle Mountain, Turkey Pen, Whitman Draft, Rohrbaugh Run, Blue Bend, and Humphrey's Draft (USFWS 1988). Approximately 1000 acres of timber sale areas have been surveyed for shale barrens using site-specific geology and aerial photos. No shale barren rock cress has been found since the 1989 endangered listing. Potential and known habitat within the entire MNF (including project acres) is estimated to be less than 100 acres. No designated critical habitat for shale barren rock cress exists on the MNF.

Virginia Spiraea - VA spiraea occurs along stream banks, usually at water's edge, of high-gradient second- and third-order stream reaches, or on meander scrolls, point bars, natural levees, and other lower-reach braid features near the stream mouth (USFWS 1991(b)). The single MNF VA spiraea site exemplifies ideal VA spiraea disturbance-adapted shrub habitat (USFWS 1991(b)). VA spiraea is restricted to riparian topography where tree competition is inhibited by scouring. VA spiraea generally is associated with riparian vegetation including, but not restricted to eastern hemlock (*Tsuga canadensis*), sedges (*Carex spp*.), Rhododendron (*Rhododendron maximum*), and Carolina tassel-rue (*Trautvettaria caroliniensis*), in third-order streams at elevations above 2600 ft (790 m) where it is not overtopped by arboreal or fast growing herbaceous species. Since its 1991 listing, the MNF has done VA spiraea surveys on approximately 60 miles of streams within 70,000 acres of project areas containing potential habitat. No new Virginia spiraea sites have been found on the MNF. Approximately 100-150 stream miles of potential VA spiraea habitat exist within potential project areas. No designated critical VA spiraea habitat exists on the MNF.

Running buffalo clover - Existing running buffalo clover populations occur in floodplain forests, field edges (Bartgis 1985), old skid roads and ungravelled truck roads, cemeteries, open woodlands (WV NHP 1991), mowed parks, jeep trails, and hawthorn thickets (Cusick 1989). It prefers semi-shaded woods and depends upon slight levels of disturbance for survival. Natural populations do not occur in areas of full sun (Ostlie 1990). Evidence indicates running buffalo clover responds favorably to low levels of disturbance that occur during road construction, use, and abandonment (USFWS 1998); terrace farming; and 4-wheel vehicle disturbance (Concannon 1997 pers. obs.). Soil disturbance resulting from construction and use of a skidder trail and silvicultural treatments opening forest canopies so the road is exposed to sunlight are factors believed to be responsible for creating additional habitat for this species (Tolin pers. comm. 1998).

Running buffalo clover has a high affinity for calcium-rich soil, restricted to Greenbrier Limestone or areas downslope from this formation that receive nutrient run-off. Prior to it listing, running buffalo clover was known at only 2 West Virginia sites. Approximately 120,000 project acres (48560 ha) have been analyzed and/or surveyed for running buffalo clover in the past 10 years. Through those surveys, running buffalo clover populations have been found on the Cheat/Potomac and Greenbrier Districts, occupying many of the running buffalo clover habitat types described above. Today, running buffalo clover is known on 11 MNF sites, with approximately 107,000 individuals. These populations contribute significantly to the viability of this species. No designated critical habitat exists on the MNF for running buffalo clover (USFWS 1989).

Small-whorled pogonia - In fall 1997, small-whorled pogonia was found on one site in the Land Type Association (LTA) Bd03 on the Marlinton/White Sulphur Ranger District. Associates are part of the indicator suite for a white pine ecological association, which occurs in southern and drier parts of the MNF. The area is traversed by 80+ year-old logging roads. While the local flora is described as dry woodland type, the relative humidity is higher than the surrounding landscape due to lateral water drainage from upslope. These local microclimatic conditions control small-whorled pogonia habitability.

Approximately 5000 acres of the white pine, low elevation ecological landtypes of LTA Bd03 (DeMeo 1998) in the MNF have been surveyed for small-whorled pogonia. In addition, all proposed projects across the MNF have been surveyed. No new sites have been found. No designated critical small-whorled pogonia habitat exists on the MNF.

Regional Forester's Sensitive Species

During the spring and summer of 1999, the Eastern Region's (R9) National Forests gathered information and met in a series of sub-regional workshops to initiate review and update of the RFSS and list. The goal of this update was to integrate new information, gathered since the previous update of March 8, 1994, along with newly adjusted designation criteria designed to better address the NFMA viability requirements for respective R9 National Forests. The MNF evaluated over 600 plant and animal species, including those listed in the *Forest Plan* as sensitive or species of concern (*Forest Plan, Appendix U*), those on the State of West Virginia's threatened, endangered, or rare lists, as well as others identified by concerned citizens. The resulting list of sensitive species was formally updated on February 29, 2000; the MNF identified 87 species (46 animals, 41 plants) for inclusion on this RFSS list, which is broken down by taxonomic group in Table 2.

Specific habitat requirements of RFSS are summarized in Table 2. Together, the 87 species designated as RFSS for the MNF are associated with a variety of habitats found on the MNF, including ponds, streams, wetlands, openings, rock outcrops, cliffs, caves, alpine areas, spruce-fir forest, northern hardwood forests (including mixed conifer hardwood and rich hardwood variants), and dry oak and hardwood forest variants. Assessment of how the Proposed Action, action alternatives, and no action alternative provide for protection of known or likely RFSS occurrences can best be made through 1) a general review of effects that are consistent across all species; 2) and/or by grouping these species by the habitats with which they are associated, and determining how well each alternative guides management of those habitats; 3) and/or looking at individual RFSS and determining effects to that species. Details regarding effects to RFSS will be discussed in all three contexts.

DIRECT AND INDIRECT EFFECTS

Federally Listed and Proposed Threatened and Endangered Species

No Action Alternative:

This alternative is implementation of the existing *Forest Plan*, as amended to date, and is the direction currently guiding management of the MNF. **The general effects and determinations as described in the Revised BA would apply to this alternative.**

As a outcome of the Revised BA The Forest determined that continued implementation of the *Forest Plan* would result in findings of "No Effect" and/or "May Effect – Not Likely to Adversely Effect" for the bald eagle, Cheat Mountain salamander, VA big-eared bat, WV northern flying squirrel, running buffalo clover, shale barren rock cress, small-whorled pogonia, and VA spiraea (*Revised Biological Assessment*, pp. 2-4 and USFWS correspondence 11/09/2001). The Forest also determined that all activities that involve tree cutting or prescribed fire would result in a "May Effect, Likely to Adversely Effect" for the Indiana bat.

Effects Related to Indiana bat

Terms and Conditions as defined in the *Biological Opinion* would not be incorporated into the *Forest Plan*. Direct, indirect and cumulative effects of implementation of the *Forest Plan*, as they relate to federally listed species, are detailed in the programmatic *Revised Biological Assessment* (USDA 2001). Because the *Terms and Conditions* would not be incorporated into the *Forest Plan*, this alternative would be a violation of the ESA and the NFMA.

With regard to the Indiana bat the chances of directly harming an individual bat during MNF tree cutting activities or prescribed fire in the general forest area is relatively small, but is not discountable. It is not discountable due to the fact that there may potentially be roosting bats and/or maternity colonies in upland areas; the ability of this mobile species to move into "cleared" project areas; and the lack of sufficient knowledge of this species. The risk of harming Indiana bats by removing an occupied roost tree or a maternity roost tree is small considering: (1) the limited amount of the MNF affected annually by tree removal; (2) some of this removal occurs by means of helicopter logging during the bat hibernation (when Indiana bats are not roosting in trees); and (3) the vast numbers of suitable roost trees (both living and dead) available for the relatively small number of Indiana bats that inhabit the MNF during the summer and fall months. Although the possibility of take does exist the *Biological Opinion* concluded that implementation of the *Forest Plan* was not likely to jeopardize the continued existence of the Indiana bat.

Overall, indirect effects to general Indiana bat habitat in both the overall forest area and the five-mile radii surrounding known hibernacula from MNF activities are more positive than negative. Most MNF acreage provides potential roosting habitat and many existing MNF standards improve or supply additional roosting and foraging habitat (e.g. standards for leaving snags, wetland and seep protections, corridor protections). During commercial timber harvests and other activities in which trees are felled, potential roost trees are removed; however, the effects are extremely minor compared to total roost tree numbers available on the MNF.

Although the removal of trees can result in a negative impact at times, it may also provide more suitable roost trees through exposing new and existing snags to additional solar exposure.

Effects Related to WV northern flying squirrel

The general effects and determinations as described in the Revised BA would apply.

However, in their November 2001 correspondence, the USFWS concurred with MNF personnel's findings that continued implementation of the *Forest Plan* would result in a No Effect or a May Effect, but was Not Likely to Adversely Effect WV northern flying squirrels. USFWS's concurrence was contingent on the MNF changing WV northern flying squirrel OA 832 standards to make them more consistent with the *Appalachian Northern Flying Squirrels' Recovery Plan (Updated)*. The No Action alternative would be inconsistent with the Updated Recovery Plan and with USFWS concurrence.

Under the No Action the burden of proof is placed on live trapping and/or the placement and monitoring of nest boxes to determine if potential habitat is occupied. The USFWS, WV DNR, MNF, and the Recovery Team agree, based on the data gathered over the past 10 years, that this approach may not have protected WV northern flying squirrel habitat to the fullest extent possible. WV northern flying squirrels are less likely to use nest boxes or enter traps in good quality habitat due to the natural presence of numerous den sites and an abundance of preferred foods. The indication that the WV northern flying squirrel has a strong preference for natural versus artificial habitat elements could theoretically result in some degree of under-representation of occupied habitat when using these methods of sampling, although this cannot be empirically demonstrated (USFWS 2001). As a result, under this alternative less protection would be afforded the better quality habitat.

Effects Related to Virginia big-eared bat

The general effects and determinations as described in the Revised BA would apply.

Effects Related to Editorial/Administrative Changes Or Clarifications

No changes would occur. The *Forest Plan* would not identify all known TE species on the MNF. Updates to the federally listed and proposed, threatened and endangered list that identify new species for the MNF will automatically trigger the protections inherent in the *Forest Plan* and FS policy. These protections will be implemented under the general language and direction of the existing *Forest Plan* (e.g. "Management will protect or enhance habitat for threatened and endangered species") but may not be as straightforwardly stated.

The general effects and determinations as described in the Revised BA would apply.

Proposed Action Alternative:

The Proposed Action would add, modify, and/or delete Forest-wide, Management Prescription, and Zoological Area standards of the 1986 *Forest Plan* (as amended to date). Various standards would be integrated into the *Forest Plan* that would address pertinent new scientific information about threatened and endangered species. The most noticeable changes that the Proposed Action would make would be in the management of Indiana bat and WV northern flying squirrel habitat. The proposed Action would formally integrate the "*Terms and Conditions*" of the of the USFWS's *Biological Opinion* for the Indiana bat and the "Guidelines for Habitat Identification and Management for Glaucomys sabrinus fuscus" from the Appalachian Northern Flying Squirrels' Recovery Plan (Updated) into *Forest Plan* direction. The Proposed Action would create MP 6.3 and associated standards (e.g. seasonal restrictions) that would provide for protection of swarming areas (five-mile radii around hibernacula) around known Indiana bat hibernacula.

Effects Related to Proposed Changes for Indiana bat

This alternative incorporates into the *Forest Plan* the USFWS issued *Terms and Conditions* for the Indiana bat found in the *Biological Opinion*. *Terms and Conditions* are designed to further minimize the likelihood of incidental take (death or harm) of Indiana bats during implementation of the MNF's *Forest Plan*. This alternative does not incorporate the Conservation Recommendations of the *Biological Opinion*. The Proposed Action also includes seasonal restrictions on tree felling for large-scale activities.

During formal consultation, USFWS identified *Reasonable and Prudent Measures*, and *Terms and Conditions* to minimize the take of Indiana bats and documented these conditions in the *Biological Opinion*. The integration of these terms and conditions into the *Forest Plan* through the amendment process, will 1) minimize the level of the incidental take due to tree felling identified for the Indiana bat on both a programmatic and site-specific scale; and 2) minimize the potential effect of prescribed fire and smoke on occupied Indiana bat hibernacula or roosting bats.

At a Forest level, however, incorporation of these T&Cs is unlikely to remove all chance for incidental take. To further reduce the likelihood of incidental take of Indiana bats during implementation of the MNF's *Forest Plan*, the Proposed Action includes seasonal restrictions on tree felling for large-scale activities (e.g. most timber sales, construction of collector and arterial roads, etc.) via establishment of MP6.3. These activities are prohibited within the primary range (MP6.3) of the Indiana bat between April 1 and November 15, during which time Indiana bats would most likely be in hibernacula. Restricting tree felling for large-scale activities to periods when the bat is hibernating has, in theory, the effect of further reducing potential for incidental take of Indiana bats – through the reduction in number of potentially occupied roost sites that are disturbed. The direct effect of this seasonal restriction would be that the chance of incidental take of Indiana bat would be discountable within the area of influence for Indiana bat.

The BA determined that the continued implementation of the *Forest Plan* would result in A May Affect, Not Likely To Adversely Affect to bald eagle, Cheat Mountain salamander, VA big-eared bat, WV northern flying squirrel. Incorporation of *Terms and Conditions* would have very minimal effect on these species. Seasonal restrictions would further diminish the risk to these species, as these species are generally inactive or less active during the winter when harvest would occur, over-wintering habitat (e.g. caves) may occur where the threat from tree felling is removed; or species may not be present on the MNF during winter. Although it is difficult to determine the degree of benefit achieved through this further reduction, it is believed to be very minimal given the scale and design of timber harvests and other tree felling activities.

The Proposed Action would protect Indiana bat hibernacula and lands within 200 feet, key areas (at least 150 acres of mature or old growth stands near hibernacula), maternity roosts (2 mile buffer) and the primary range (swarming areas/land within five mile radii of Indiana bat hibernacula). Indirectly, provisions that would result in mature and older aged stands, longer rotations, and their associated elements (snags, dead and down woody debris, small openings, more open canopies, greater diversity in the understory) would generally result in favorable habitat elements for Indiana bat, Cheat Mountain salamander, WV northern flying squirrel and possibly small-whorled pogonia.

The Proposed Action would retain all shagbark hickory trees in cutting units except where public safety concerns exist. Retention of shagbark hickory trees would provide additional roosting habitat to Indiana bat and to a small degree VA big-eared bat. Other TE species are likely to incur minimal or no effects as a result of this proposed change.

There may also be direct and indirect benefits to Indiana bat and other TE species that require snags or cavities as a result of the protection or creation of snags, prioritization of snags by size class (16 inches dbh or greater preferred), protection of roost trees, larger diameter trees, longer rotations, and old growth requirements of this alternative. For example, and bald eagle may benefit from super canopy trees and from standing snags while species such as the Cheat Mountain salamander would indirectly benefit from dead and downed logs after snags fall. A review of existing Indiana bat literature (Menzel et al 2001) indicates that Indiana bats show a clear preference for these habitat elements.

Creating and protecting areas of influence for Indiana bat could conceivably create conflicts with other conservation efforts for threatened and endangered species that require disturbance, such as running buffalo clover, that occur within these areas of influence (e.g. protections may limit disturbance levels within the area of influence). Disturbance could be needed, for example, in terms reducing shade for shade intolerant species, introduction of fire for habitat maintenance, or eliminating invasive exotic tree species. The probability of the coincidence of a known TE occurrence within the protected area around a maternity roost tree is so low at this time (given the current lack of known roost trees on the Forest) as to make the risk nearly discountable. Overlap between Indiana bat primary range (MP6.3) and other TE areas of influence, especially WV northern flying squirrel (OA 832) is more likely. Approximately 35,000 acres of MP6.3 overlap WV northern flying squirrel suitable habitat. Management objectives for Indiana bat and WV northern flying squirrel, as well as other TE species found on the MNF, are not expected to be incompatible. In any case, such conflicts could be resolved in ways that attempt to maintain both Indiana bat and other TE species at issue. In those rare cases where they are incompatible, conflicts would be resolved through consultation with USFWS. Generally, any irreconcilable conflicts between Indiana bat standards as proposed and other TE management goals are not anticipated.

Standards under the Proposed Action (EA Appendix A, p.8) that require any new Indiana bat hibernacula discovered to have an appropriate protection plan (which could include signs, fences, or gates) will provide beneficial effects to Indiana bat. These same standards will also benefit VA big-eared bat if the newly discovered cave is also occupied by this species.

Compared to the No Action standards under this alternative (EA Appendix A pp 14-23) that favor group selection, shelterwood, and two-aged regeneration harvest in Indiana bat primary range (MP6.3) generally will provide better foraging and roosting habitat for Indiana bat (MacGregor 1999). the retention of additional residuals, larger trees, and greater basal areas within cutting units should contribute additional habitat elements for the future in support of some TE species (e.g. Cheat Mountain salamander, Indiana bat, bald eagle) that require more humid microclimates, snags, or dead and down logs. Residual trees receiving increased solar radiation become more desirable as Indiana bat roost trees and potential maternity roosts, and the regenerating forest provides additional varieties and numbers of insect prey for all eastern woodland bat species. Plant species such as running buffalo clover, which require moderate openings in the canopy would also benefit from this emphasis.

Although clearcutting is not the preferred silvicultural practice, it is allowed in MP 6.3 in some cases. Indiana bats have been shown to occupy highly altered landscapes in many areas in the eastern United States. Anecdotal evidence suggests that the Indiana bat may, in fact, respond positively to some degree of habitat disturbance (USFWS 2002). Callahan et al. (1997) even suggested that management practices, such as even-aged and uneven-aged management, could be used if they include provisions for snag retention and if oaks and shagbark hickories are favored. Research suggests that Indiana bats may benefit from limited disturbance around potential roosting areas. Limited disturbance can create potential roost trees (Gardner et al. 1991) and open the canopy around potential roost trees (Gardner et al. 1991, Kurta et al. 1993). In any case, disturbances from timber practices or from other factors that change behavior of Indiana bats but do not change overall habitat fitness should not be considered negative (Menzel et al. 2001). Regardless of the method, timber harvest that is allowed under this alternative would be consistent with the level that was analyzed in the Revised BA. Consequently, the effects for all TE species are the same as described in the BA and in the No Action Alternative.

Effects Related To Proposed Changes For WV Northern Flying Squirrel

Under the Proposed Action the net increase of acres receiving additional, immediate protection via standards for WV northern flying squirrel under this alternative will be approximately 49,500*. However, given additional time and surveys this acreage (and more) may eventually be demonstrated to be "occupied" under the No Action Alternative, thus ultimately receiving the same protections and conveying the same or greater effects on other resources. This immediate, straight away approach under the Proposed Action would result in beneficial effects to the squirrel; less uncertainty and greater efficiency in planning and implementing activities; and cost savings (both surveys and planning dollars).

By and large, the same restrictions that apply to "occupied" habitat under the No Action Alternative based on general direction in the Forest Plan are applied to "suitable" habitat under the Proposed Action. The effect of implementing this alternative would be to distribute these restrictions spatially in a different manner in MPs that are actively managed (MP 2.0, 3.0, 4.0, and 6.1). Restrictions would be removed on approximately 26,000 acres, remain constant on approximately 39,000 acres, and added to approximately 49,500 acres.

Removal of restrictions on the approximately 26,000 acres may effect, but would not likely adversely effect WV northern flying squirrel on the MNF as these acres provided few or none of the habitat elements required by the squirrel. If WV northern flying squirrels do in fact occupy some of these acres or use areas as corridors, those areas identified will be incorporated into the suitable map as USFWS, WV DNR and the MNF refine the map at the watershed and project levels. As such, those areas will continue to protect WV northern flying squirrels and their habitat. Other known TE species that occupy these areas will no longer receive protections associated with WV northern flying squirrel but will be subject to independent protections associated with the individual TE species (e.g. buffers around Cheat Mountain salamander locations).

No effects to WV northern flying squirrel or other TE species would result from those acres that remain constant under these restrictions. The effect of redistribution would provide protection to more appropriate, high quality areas fitting the WV northern flying squirrel's exhibited habitat preferences on approximately 51,000 acres. These additions to OA 832 would provide further protections for clearly identified WV northern flying squirrel habitat promoting recovery of this endangered species. Effects of these subtraction or addition of acres and/or redistributions on other TE found on the MNF would be considered to be minimal.

Overlap with other TE areas of influence would occur. Approximately 38,000 acres of Indiana bat primary range (MP6.3) overlap WV northern flying squirrel suitable habitat. As discussed above, most conflicts could be resolved in ways that attempt to maintain both Indiana bat and any other TE species at issue through consultation with USFWS. Irreconcilable conflicts between WV northern flying squirrel guidelines as proposed and other TE management goals are not anticipated.

* Acres do not include MP 5.0 and 6.2 areas as these provide sufficient protections to the WV northern flying squirrel currently (. Changes between acres occur in different areas -. non-suitable habitat within ½ circles is being removed from protections that exist under the No Action Alternative while other areas more likely to give refuge to WV northern flying squirrel are being added. For example, about 58,000 acres of MP 6.1 would be managed as suitable habitat for WV northern flying squirrel (added to OA 832), and elsewhere about 15,000 acres would be removed from OA 832 and returned to MP 6.1 management. This 15,000 acres does not come from the 58,000 acres, however the net effect overall is for about 43,000 acres to change from MP 6.1 to OA 832 (MP 8).

Effects Related To Proposed Changes For Virginia Big-Eared Bat

Standards proposed under this alternative (Appendix A pp.6, 25-30) are fairly consistent with those in the current *Forest Plan* (No Action). The area of influence for VA big-eared bat will be assigned to MP 8.0, Opportunity Area 837.

Proposed changes include:

- Before taking any actions on buildings that are within six miles of VA big-eared bat hibernacula or maternity sites, evaluate their potential to serve as roosting habitat and apply management protections as necessary.
- Burn plans for prescribed fires will be developed to ensure adverse effects to Virginia big-eared bats are avoided.

The Revised BA determined that continued implementation of the *Forest Plan,* including protections for VA big-eared bat, would result in no adverse effects to TE species, with the exception of the Indiana bat, found on the MNF. Identified adverse effects to the Indiana bat where not related to implementing VA big-eared bat protections. Implementation of changes proposed for VA big-eared bat would not change the effects to nor the determination for these species as discussed in the Revised BA with the following exception. Standards added give clarity to normal procedural actions, which would result in a slight beneficial effect to VA big-eared bat.

Effects Related To Proposed Editorial/Administrative Changes Or Clarifications

Under this alternative all TE species found on the MNF would be identified in the *Forest Plan* and additional resource protection and monitoring objectives for TE species added. Changes will have no negative impact to current TE species. Designations of federally listed and proposed species are actions undertaken by entities other than the MNF, and we are therefore required by law, policy, and the *Forest Plan* to recognize these designations, as frequently as they may change. Referencing a current list held by USFWS will serve the needs of these species more effectively by helping keep up with changes in this rather dynamic area. Updates to the federally listed and proposed, threatened and endangered list that identify new species for the MNF will automatically trigger the protections inherent in the *Forest Plan* and FS policy.

Many of these protections have been implemented in the past under the general language and direction of the existing *Forest Plan* (e.g. “Management will protect or enhance habitat for threatened and endangered species”). Standards added give clarity to normal procedural actions. Also, programmatically the scale of these protections is relatively small (~ 4,500 acres) compared to the overall forest acreage and there is little overlap between areas. Consequently, formalizing these protections in the *Forest Plan* would result in minimal direct or indirect effects to TE species. If there were an impact at all, it would be beneficial, in that MNF goals, objectives, and direction will be more clearly articulated within the *Forest Plan*, and so will heighten awareness and understanding of the TE program and the Forest’s responsibility regarding viability of rare species.

Editorial and/or administrative changes such as reporting requirements would not affect TE species.

Alternative 1 – *Proposed Action, No Seasonal Restrictions, Conservation Recommendations*

Effects Related To Proposed Changes For Indiana Bat

For this alternative direct and indirect effects associated with these changes differ from the No Action Alternative in the same manner as described for the Proposed Action with the following exceptions:

The Proposed Action included standards with seasonal restrictions intended to further reduce the chance of “taking” a roosting Indiana bat beyond what USFWS identified in the *Biological Opinion*. Alternative 1 does not include these seasonal restrictions. The direct effect of not applying seasonal restrictions in key areas and primary ranges of the Indiana bat would be that the risks for incidental take would be greater than under the Proposed Action but less than the No Action. However, the level of incidental take incurred under this alternative would still fall within that permitted under the Incidental Take Permit issued by the USFWS.

This alternative would incorporate the *Terms and Conditions* in the same manner that the Proposed Action does, thus effects of these changes differ from the No Action Alternative in the same manner as described for the Proposed Action.

Alternative 1 also differs from the Proposed Action in that it includes standards incorporating USFWS recommended *Conservation Measures*. Incorporating these *Conservation M*easures into the *Forest Plan* would expand and add emphasis and focus to the MNF's existing conservation education efforts. These conservation efforts - which are designed to reduce potential for incidental take, improve habitat conditions, enhance our knowledge, and broaden citizenry awareness - assist in recovery of TE species and wildlife conservation as a whole. As such, incorporating *Conservation Measures* would result in beneficial effects to Indiana bat and many other TE and RFSS species

Retaining or creating small pools of water will provide additional sources of drinking water for forest bats (including the Eastern small-footed bat), other RFSS, and many additional wildlife species.

No negative effects are anticipated to other TE species from the implementation of these Conservation Measures.

Effects Related To Proposed Changes For WV Northern Flying Squirrel, Virginia Big-Eared Bat Editorial/Administrative Changes Or Clarifications

For this alternative direct and indirect effects associated with these changes differ from the No Action Alternative in the same manner as described for the Proposed Action.

Alternative 2 – *Proposed Action, Conservation Measures, No Timber Harvesting*

Alternative 2 was developed to provide maximum roost tree protection and reduce potential for incidental "taking" of an Indiana bat more than any other alternative.

Effects Related To Proposed Changes For Indiana Bat

Alternative 2 like the Proposed Action:

- Incorporates and/or exceeds the USFWS-issued *Terms and Conditions* for the Indiana bat found in the *Biological Opinion* into the *Forest Plan, and*
- The area of influence for Indiana bats is divided into distinct, biologically based areas—hibernacula and lands within 200 feet, key areas (at least 150 acres of mature or old growth stands near hibernacula), maternity colonies and lands within a two-mile radius, and the primary range (land within five-mile radii of Indiana bat hibernacula), and
- Hibernacula, key areas, and land within two miles of maternity colonies of Indiana bats will be managed under Forest-wide and *Zoological* Area standards (MP 8.0, Opportunity Area 838) with specific restrictions and management objectives geared to the protection and recovery of Indiana bats.

Consequently for these actions, direct and indirect effects differ from the No Action Alternative in the same manner as described for the Proposed Action.

However, under Alternative 2 **the primary range of the Indiana bat will be managed under Forest-wide and *Zoological* Area standards** (MP 8.0, Opportunity Area 838) with specific restrictions and management objectives geared to the protection and recovery of Indiana bats. MP 6.3 and associated standards would not be created (EA Appendix A, 13-22).

This alternative **would prohibit commercial timber harvests within key areas, within two-mile radii of maternity colonies, and within the primary range of the Indiana bat** (Appendix A, p. 32). Non-commercial methods of vegetation management would be used to create a variety of tree species, sizes, and age classes for Indiana bats and other wildlife (Appendix A, p.31). While this alternative does work towards Indiana bat recovery through integration of the *Terms and Conditions* conservation program, it is nearly equivalent to the Proposed Action in reducing the potential for incidental take.

During formal consultation, the USFWS identified reasonable and prudent measures, and terms and conditions to minimize the take of Indiana bats and documented these conditions in the *Biological Opinion*. Prohibiting commercial timber harvests within key areas, within two-mile radii of maternity colonies, and within the primary range of the Indiana bat has, in theory, the effect of further reducing the potential for incidental take of Indiana bats – through the reduction in number of potentially occupied roost sites that are disturbed – from that described in the No Action. Although it is difficult to determine the degree of benefit achieved through this further reduction, it is believed to be nearly equivalent to that described in the

Proposed Action. The direct effect of this restriction would be that within the area of influence there would be no chance incidental take as a result of commercial timber harvests. The chance of taking an Indiana bat inside the area of influence as a result of tree felling for small-scale activities, or outside of these areas through all activities, would be discountable.

Under this alternative management of vegetation 5" dbh or greater may be implemented within the primary range of Indiana bats, but only to improve or enhance Indiana bat habitat, to maintain or enhance natural vegetative communities on appropriate sites (see Forest-wide standards and guidelines 1900 – Vegetation), or for public safety. Also, see OA 838 standards for 2400 (Timber Management) and 2670 (Threatened and Endangered Species that are related to vegetation management. Non-commercial methods of vegetation management would be used to create a variety of tree species, sizes, and age classes for Indiana bats and other wildlife (Appendix A, p.31). – normally girdling trees without tree feeling. The indirect effect of this would be improved habitat conditions for Indiana bat. Due to potential economic constraints the total number of acres improved may be less than other alternatives.

Alternative 2 is similar to Alternative 1 in that it 1) incorporates the "Conservation Recommendations" identified in the USFWS's *Biological Opinion*, and 2) it would not impose a seasonal limitation on large-scale tree felling activities (Appendix A, p. 32) within key areas and the primary range. Consequently for these actions, direct and indirect effects would differ from the No Action in the same manner as described in Alternative 1.

Effects Related To Proposed Changes For WV Northern Flying Squirrel, Virginia Big-Eared Bat Editorial/Administrative Changes Or Clarifications

For this alternative direct and indirect effects associated with these changes differ from the No Action Alternative in the same manner as described for the Proposed Action.

Regional Forester's Sensitive Species

No Action Alternative:

The No Action Alternative is the implementation of the existing Forest Plan, as amended to date. This alternative would support the Forest's goal for RFSS management, which is to "Protect sensitive and unique species until their populations are viable" (Forest Plan, p. 37). The *Forest Plan* provides direction for the management of RFSS through Forest-wide threatened and endangered species' standards/guidelines (*Forest Plan* p. 87). Forest activities--such as tree felling and earth disturbance (whether via commercial or non-commercial methods)--have the potential to affect RFSS; but, consistent with existing Forest Plan direction, RFSS would be considered in the design of projects and afforded the highest possible protection commensurate with other appropriate uses and benefits. Standards specify that surveys will be done during and as part of normal project reconnaissance and design; mitigation measures will be made part of the project design when RFSS are present; and data will be collected on RFSS. Forest Service policy also requires biological evaluations to be completed on all projects with the potential to impact sensitive species.

Action could be taken under the No Action Alternative to enhance RFSS habitat (e.g. remove individual trees around a population of showy lady slipper orchid or running buffalo clover--via non-commercial means--to provide more light for these species; install fence around sensitive plant populations to prevent deer from removing individuals or destroying populations, control of invasive species).

This alternative may impact individuals but is not expected to result in the loss of RFSS' viability or create significant trends toward Federal listing.

Proposed Action Alternative:

Effects Related to Proposed Changes for Indiana bat

General effects of implementing this alternative on RFSS as a group appear to be minor and predominantly beneficial.

Added protection associated with hibernacula, key areas and around potential or actual maternity and summer roost trees could directly or indirectly benefit RFSS species that 1require mature-old growth stands (e.g. Northern goshawk); 2) require snags and dead and down material; or 3) are sensitive to disturbance (e.g. Eastern small-footed bat, most plant RFSS).

Under the Proposed Action if any new Indiana bat hibernacula are discovered, the MNF shall develop an appropriate protection plan, which could include signs, fences, or gates. RFSS that inhabit these caves would incur beneficial effects in that they would be considered in the protection plan.

Buffers around hibernacula and key areas to protect them from disturbances that might alter water quality or flow, air quality or flow, temperature, and humidity will benefit bats and other cave dwelling RFSS. Impacts to water quality as a result of these buffers or seasonal restrictions (see riparian and aquatics effects) could also directly or indirectly affect RFSS fish, mollusks, cave dwelling, and other species (e.g. hellbender) associated with surface or subterranean ponds or streams. Generally, elimination of activities within the area of influence that produce erosion and sedimentation would have beneficial impacts in the same way riparian buffers may lessen sedimentation, whereas seasonal restrictions may generate negative impacts to these species due to increased risk of water quality degradation.

The Proposed Action would retain all shagbark hickory trees in cutting units except where public safety concerns exist. Retention of shagbark hickory trees would provide additional roosting habitat to Eastern small-footed bat. Other RFSS are likely to incur minimal or no effects as a result of this proposed change.

The Proposed Action would protect Indiana bat hibernacula and lands within 200 feet, key areas (at least 150 acres of mature or old growth stands near hibernacula), maternity roosts (2 mile buffer) and the primary range (swarming areas/land within five miles of Indiana bat hibernacula). Indirectly, provisions such as longer rotations that would result in mature and older aged stands, and their associated elements (old growth, larger diameter trees, snags, dead and down woody debris, small openings, more open canopies, greater diversity in the understory) would generally result in favorable habitat elements for many RFSS associated with mid-late seral habitats. For example, there would be direct and indirect benefits to terrestrial RFSS requiring snags or cavities as a result of creation/ protection of snags. Eastern small-footed bats would benefit from standing snags while species such as the Southern rock vole, Appalachian/Southern water shrew, timber rattlesnake, green salamander and sensitive fish species would indirectly benefit from dead and downed logs after snags fall. Protection of hibernacula and surrounding areas, key areas, and trees with exfoliating bark, would provide habitat favored by Eastern small-footed bats.

Implementation of these proposed standards would further enhance habitat suitability for many terrestrial RFSS species by providing roosting, denning, and cavity nesting at a landscape level, through the retention of snags, additional large diameter leave trees, and cull trees during all timber management activities.

Standards (EA Appendix A pp 16-23.) under this alternative that favor group selection, shelterwood, and two-aged regeneration harvest over clearcutting in Indiana bat primary range (MP6.3) generally will provide preferred foraging and roosting habitat for Indiana bat (MacGregor 1997). Retention of additional residuals, larger trees, and greater basal areas within cutting units should contribute additional habitat elements for the future in support of RFSS that require humid microclimates, shading, snags, or dead and down logs. The regenerating forest also provides additional varieties and numbers of insect prey for all eastern woodland bat species and other insectivores. Plant species (e.g. Long-stalked holly, butternut) that require moderate openings in the canopy would also benefit from this emphasis.

Seasonal restrictions would further diminish the risk to terrestrial wildlife RFSS that are sensitive to disturbance, as these species are generally inactive or less active during the winter when harvest would occur, over-wintering habitat (e.g. caves) may take place where the threat from tree felling is removed; or the species may not be present on the MNF during the winter. Although it is difficult to determine the degree of benefit achieved through this further reduction, it is believed to be only minimal given the scale, scope and design of these activities and protections provided for these types of species elsewhere on the MNF (e.g., MP 5.0,MP 6.2).

Overlap between Indiana bat primary ranges with habitats of certain RFSS may occur but management for Indiana bat would generally provide parallel, beneficial effects to RFSS found in these habitats

Protections could conceivably create conflicts with RFSS protection for species that may occur in Indiana bat areas of influence and require disturbance. Disturbance could be needed, for example, in terms reducing shade for shade intolerant species, introduction of fire for habitat maintenance, or eliminating invasive exotic species. In any case such conflicts could be resolved in ways that attempt to maintain both Indiana bat and the RFSS at issue. Irreconcilable conflicts between Indiana bat guidelines as proposed and RFSS management goals are not anticipated

Effects Related to Proposed Changes for WV northern flying squirrel

General effects of implementing this alternative on RFSS as a group appear to be limited.

Additional programmatic protections, resulting from protection of WV northern flying squirrel "suitable" habitat, may indirectly be afforded RFSS that may be associated with alpine or spruce-fir habitats, such as Northern goshawk, Eastern small-footed bat or Fraser fir. Removal of restrictions on the approximately 33,000 acres "may impact individuals but would not likely to cause a trend to federal listing or a loss of viability". RFSS occurring on these acres would receive the same protections as identified under the No Action.

Surveys are normally conducted for RFSS associated with alpine or spruce fir habitats on a project-by-project basis. Under the Proposed Action surveys would be unnecessary in WV northern flying squirrel "suitable" habitat. This would result less uncertainty and greater efficiency in planning and implementing activities, cost savings (both in surveys and planning dollars), and protection of RFSS.

Under the Proposed Action, larger, more contiguous blocks of this habitat type would be protected. This would indirectly benefit those RFSS that require less fragmented habitats (e.g. Northern goshawk).

With a reduction in timber harvest activities in this community type, small-scale habitat features (e.g. talus slopes or rock outcroppings) that may be nested within or immediately next to "suitable" habitat would likely receive some degree of protection that would not exist under the No Action. These features provide habitat for RFSS such as Southern rock vole, Allegheny woodrat, or timber rattlesnake, which would potentially receive indirect beneficial effects from additional protections.

As discussed above with Indiana bat, protecting WV northern flying squirrel "suitable" habitat could conceivably create conflicts with RFSS conservation efforts for those species that require disturbance. As discussed in the No Action section for TE species, these conflicts may eventually occur regardless as more areas are identified as "occupied" given time and additional surveys. Again, such conflicts could be resolved in ways that attempt to maintain both WV northern flying squirrel and the RFSS at issue. Irreconcilable conflicts between WV northern flying squirrel guidelines as proposed and RFSS management goals are not anticipated.

Effects Related to Proposed Changes for VA big-eared bat

Effects would be the same as described under the No Action.

Effects Related to Proposed editorial/administrative changes or clarifications

Many of these protections have been implemented in the past under the general language and direction of the existing *Forest Plan* (e.g. "The Plan directs that "Sensitive wildlife species will be afforded the highest possible protection commensurate with other appropriate uses and benefits." Standards specify that surveys will be done during and as part of normal project reconnaissance and design; mitigation measures will be made part of the project design when RFSS are present; and data will be collected on RFSS. In addition, Forest Service policy requires biological evaluations to be completed on all projects with the potential to impact sensitive species. "). Standards added give clarity to normal procedural actions. Also, programmatically the scale of these protections is relatively small (~ 4,500 acres) compared to the overall forest acreage and there is little overlap between areas. Consequently, formalizing these protections in the *Forest Plan* would result in minimal change in effects to RFSS species than those experienced under the No Action. If there were an impact at all, it would be beneficial, in that MNF goals, objectives, and direction will be more clearly articulated within the *Forest Plan*, and so will heighten awareness and understanding of the threatened, endangered and sensitive species (TES) program and the Forest's responsibility regarding viability of rare species.

Changes such as avoiding activities in known federally listed or proposed threatened and endangered, species populations and occupied habitat, establishing areas of influence, implementing appropriate habitat management techniques to maintain or enhance populations of listed or proposed threatened and endangered species, and minimizing or eliminating threats to listed or proposed threatened and endangered species due to non-native invasive species should result in beneficial effects to associated RFSS species.

Editorial and/or administrative changes are not likely to affect RFSS.

Alternative 1 – Proposed Action, No Seasonal Restrictions, Conservation Recommendations

Effects Related to Proposed Changes for Indiana bat

For this alternative direct and indirect effects associated with these changes differ from the No Action Alternative in the same manner as described for the Proposed Action with the following exceptions:

Alternative 1 does not incorporate seasonal restrictions. By not incorporating seasonal restrictions increased risk associated with erosion and sedimentation would be avoided. Although minimal, adverse indirect effects to RFSS habitat, such as degradation of water quality, would be avoided similar to the No Action Alternative.

Standards incorporating USFWS recommended *Conservation Measures*. Incorporating these *Conservation Measures* into the *Forest Plan* would expand and add emphasis and focus to the MNF's existing conservation education efforts. Conservation efforts such as these reduce potential risk for negative impacts to RFSS, improve habitat conditions, enhance our knowledge, and broaden citizenry awareness of threatened, endangered, sensitive species and wildlife conservation as a whole. As such, incorporating *Conservation Measures* would result in beneficial effects to RFSS species and many other wildlife species.

Retaining or creating small pools of water will provide additional sources of drinking water for forest bats (including the Eastern small-footed bat), other RFSS, and many additional wildlife species.

No negative effects are anticipated to other RFSS species from the implementation of these Conservation Measures.

Effects Related To Proposed Changes For WV Northern Flying Squirrel, Virginia Big-Eared Bat Editorial/Administrative Changes Or Clarifications

For this alternative direct and indirect effects associated with these changes differ from the No Action Alternative in the same manner as described for the Proposed Action.

Alternative 2 – *Proposed Action, Conservation Measures, No Timber Harvesting*

Effects Related to Proposed Changes for Indiana bat

Like the Proposed Action, Alternative 2:

- Incorporates and/or exceeds the USFWS issued *Terms and Conditions* for the Indiana bat found in the *Biological Opinion* into the *Forest Plan, and*
- The area of influence for Indiana bats is divided into distinct, biologically based areas—hibernacula and lands within 200 feet, key areas (at least 150 acres of mature or old growth stands near hibernacula), maternity colonies and lands within a two-mile radius, and the primary range (land within five-mile radii of Indiana bat hibernacula), and
- Hibernacula, key areas, and land within two miles of maternity colonies of Indiana bats will be managed under Forest-wide and *Zoological* Area standards (MP 8.0, Opportunity Area 838) with specific restrictions and management objectives geared to the protection and recovery of Indiana bats.

Consequently for these actions, direct and indirect effects differ from the No Action Alternative in the same manner as described for the Proposed Action.

For this alternative direct and indirect effects associated with these changes differ from the No Action Alternative in the same manner as described for the Proposed Action with the following exceptions:

This alternative **would prohibit commercial timber harvests within key areas, within two miles of maternity colonies, and within the primary range of the Indiana bat** (Appendix A, p. 32). Under this alternative management of vegetation 5" dbh or greater may be implemented within the primary range of Indiana bats, but only to improve or enhance Indiana bat habitat, to maintain or enhance natural vegetative communities on appropriate sites (see Forest-wide standards and guidelines 1900 – Vegetation), or for public safety. Also, see OA 838 standards for 2400 (Timber Management) and 2670 (Threatened and Endangered Species that are related to vegetation management. Non-commercial methods of vegetation management would be used to create a variety of tree species, sizes, and age classes for Indiana bats and other wildlife (prescribed fire, girdling trees without tree feeling).

This alternative may result in the Forest being unable to manage for a diversity of composition and age class within these areas due to economic constraints. This would indirectly result in a negative impact to RFSS and other wildlife species that are early-mid seral species and/or require disturbance. Conversely, those RFSS that are dependent upon mid-late seral stages would likely benefit from this Alternative. Indirectly, provisions that would result in mature and older aged stands, and their associated elements (old growth, larger diameter trees, snags, dead and down woody debris, small openings, more open canopies, greater diversity in the understory) would generally result in favorable habitat elements for many RFSS as described under the Proposed Action although the effect would occur at a broader scale.

The amount of regenerating forest, which provides additional varieties and numbers of insect prey for all eastern woodland bat species and other insectivores, may decrease under this alternative causing indirect negative effects to insectivores or plants that may rely on these insects for pollination.

Prohibiting commercial timber harvests within key areas, within two-mile radius of maternity colonies, and within the primary range of the Indiana bat has, in theory, the effect of reducing the potential for adverse impacts associated with commercial timber harvests to RFSS that are sensitive to disturbance. Although it is difficult to determine the degree of benefit to RFSS achieved through this further reduction from that described in the No Action, it is believed to be minimal and would not appreciably change the habitat components necessary for persistence of RFSS at the Forest scale.

Alternative 2 is similar to Alternative 1 in that it 1) incorporates the "Conservation Recommendations" identified in the USFWS's *Biological Opinion*, and 2) it would not impose a seasonal limitation on large-scale tree felling activities (Appendix A, p. 32) within key areas and the primary range. Consequently for these actions, direct and indirect effects would differ from the No Action in the same manner as described in Alternative 1.

Effects Related To Proposed Changes For WV Northern Flying Squirrel, Virginia Big-Eared Bat Editorial/Administrative Changes Or Clarifications

For this alternative direct and indirect effects associated with these changes differ from the No Action Alternative in the same manner as described for the Proposed Action.

CUMULATIVE EFFECTS

None of the alternatives would result in adverse cumulative impacts to federally listed and proposed, Threatened and Endangered Species, Region 9 Forester's Sensitive Species or prevents the achievement of the Forest goals for Threatened, Endangered or Sensitive Species management.

Habitats on the MNF support numerous TES Species--from those species that only utilize open lands, riparian habitat, caves, certain vegetation types, and certain forest structures to those that use two or more of these habitat types. Implementation of the Forest Plan since 1986 has continued to provide a mix of habitat types being dispersed across the MNFThe private lands in or near the Proclamation Boundary are also providing available habitat. Regardless of the alternative selected, TES Species habitat on MNF and private lands would continue to be affected by natural succession, land management practices, weather conditions, insects, diseases, wind and ice storms, etc. Such past, present, and reasonably foreseeable future actions have, and will continue to affect the spatial distribution of certain types and availability (location and density) of habitat components necessary for persistence of TES Species (e.g. microclimate condition, cover and nutrient sources, etc).

DETERMINATIONS

Federally Listed and Proposed Threatened and Endangered Species

Based on the analysis and determinations made by the MNF in the programmatic Revised Biological Assessment, concurrences made by the USFWS in the *Biological Opinion*, and the analysis of effects contained within this Biological Evaluation, no change in determinations are required for Eastern cougar, Gray wolf, bald eagle, Cheat Mountain salamander, Indiana bat, VA big-eared bat, WV northern flying squirrel, shale barren rock cress, VA spiraea, running buffalo clover, and the Small-whorled pogonia for any of the alternatives. The changes proposed to the *Forest Plan* in this amendment are consistent with those actions recommended by the USFWS in the *Biological Opinion* for Indiana bat and the updated *Guidelines for Habitat Identification and Management for Glaucomys sabrinus fuscus*, and do not appreciably change the effects described in the Revised BA to TE species other than the Indiana bat and WV northern flying squirrel.

The No Action Alternative would be inconsistent with the *Terms and Conditions* in the *Biological Opinion* for Indiana bat and inconsistent with the Updated Recovery Plan for WV northern flying squirrel.

The following determinations of effects to Threatened and Endangered species have been made as a result of this Biological Evaluation: These determinations apply to all alternatives.

Bald eagle (Haliaeetus leucocephalus)
May Affect, Not Likely To Adversely Affect.

Cheat Mountain salamander (Plethodon nettingi nettingi)
May Affect, Not Likely To Adversely Affect.

VA big-eared bat (Corynorhinus townsendii virginianus)
May Affect, Not Likely To Adversely Affect. This determination is made for both the VA big-eared bat and its designated critical habitat.

WV northern flying squirrel (Glaucomys sabrinus fuscus)
May Affect, Not Likely To Adversely Affect

Indiana bat (Myotis sodalis)
May Affect, Likely To Adversely Affect.

Running buffalo clover (Trifolium stoloniferum)
May Affect, Not Likely To Adversely Affect

Shale barren rock cress (Arabis serotina)
A May Affect, Not Likely To Adversely Affect

Small-whorled pogonia (Isotria medeoloides)
May Affect, Not Likely To Adversely Affect.

Virginia spiraea (Spiraea virginiana)
No Effect

Proposed Species and Habitat
No effect

No effects beyond those previously disclosed and addressed in the *Revised Biological Assessment* (USDA 2001) and *Biological Opinion (USFWS 2002)*.

Rationale:

All alternatives allow some activities that could result in disturbance to TE species or their habitats. With the exception of the Indiana bat the amount or scale of these activities combined with the protective measures that have been, or are proposed for implementation, render these impacts discountable. The actions found in all action alternatives will further promote the conservation and recovery of threatened and endangered species on the MNF.

For the Indiana bat the determination of May Effect, Likely to Adversely Effect is made as a result of large-scale tree removal activities (e.g. timber sales, road construction, minerals, and prescribed fire) that occur in all alternatives. Tree removal either in the areas of influence for the Indiana bat or beyond (forest-wide) during the non-hibernation period (April 1 - November 15) may directly result in mortality (take) of an individual roosting Indiana bat, if a tree containing a roosting bat is removed either intentionally or felled accidentally. Even if a bat using a roost tree that is removed were not killed during the removal, the roosting bat would be forced to find an alternative tree, potentially expending a significant amount of energy that would result in harm or harassment of the individual. This also constitutes take USFWS 2002).

The determination of effects of *Forest Plan* implementation on Indiana bat is documented in the Revised Biological Assessment, and has been reviewed by the USFWS, which issued its concurrence with the BA's determinations in the form of a *Biological Opinion*. All action alternatives amend the *Forest Plan* to include the *Terms and Conditions* contained within the *Biological Opinion.* These *Terms and Conditions* were identified by the USFWS as measures to minimize impacts to Indiana bat. Consequently, all action alternatives fall within the scope addressed in the USFWS *Biological Opinion* and within the level of take identified in the Incidental Take permit. The USFWS, as documented in the *Biological Opinion,* concluded that implementation of the *Forest Plan* with the mandatory *Terms and Conditions* was **not likely to jeopardize the continued existence of the Indiana bat** (USFWS 2002). Based on the analysis of effects contained in this BE, we have determined that this proposed TE Plan Amendment and its action alternatives will have **no additional effects** to Indiana bat that were not previously disclosed and evaluated during the programmatic consultation on the *Forest Plan*.

All action alternatives also amend the *Forest Plan* to include changes found in the Updated Recovery Plan and the "Guidelines for Habitat Identification and Management for *Glaucomys sabrinus fuscus*". The effects of *Forest Plan* implementation on federally listed or proposed, threatened and endangered species found on the MNF, as documented in the Revised Biological Assessment, were analyzed based upon implementation of the Updated Recovery Plan – the *Forest Plan* has broad, general direction compelling the Forest to follow the requirements of Endangered Species Recovery Plans. These determinations were reviewed by the USFWS, which issued its concurrence with the BA's determinations in the *Biological Opinion*. Consequently, incorporating proposed changes specific to the WV northern flying squirrel and the Updated Recovery Plan into the *Forest Plan* would have no additional effects to WV northern flying squirrel or other TE species beyond what has been determined in the Revised Biological Assessment.

Currently there are neither species proposed for listing on the MNF nor any proposed critical habitat. For that reason, there will be **No effect** to proposed species or habitat from the proposed TE Plan Amendment.

REQUEST FOR FORMAL CONSULTATION – The Forest also requests initiation of formal consultation on the Indiana bat (as required under ESA) under the tiering process described in the *Biological Opinion* (Term and Condition #11) for the proposed Threatened and Endangered Species Plan Amendment.

The Monongahela National Forest also requests concurrence from the US Fish and Wildlife Service on MNF determinations for the bald eagle, Cheat Mountain salamander, VA big-eared bat, WV northern flying squirrel, running buffalo clover, shale barren rock cress, small-whorled pogonia and VA spiraea.

Regional Forester's Sensitive Species

After reviewing the proposed action and alternatives, the literature, occurrence records, and consulting individuals, the following determinations regarding the Proposed Action and alternatives are made (note that there are minor differences in relative benefit and impact among the alternatives, which are discussed in the effects analysis for all sensitive species):

Alternative	RFSS	Impact
No Action	All species	May impact individuals; not likely to lead to loss of viability or a trend towards federal listing.
Proposed Action	All species	Beneficial impact; Minor negative impact to a few individual species requiring disturbance and where overlap may occur or species within affected areas that require good water quality. Generally, these impacts may be mitigated at the project level. May impact individuals; not likely to lead to loss of viability or a trend towards federal listing
Alternative 1	All species	Beneficial impact; May impact individuals; not likely to lead to loss of viability or a trend towards federal listing.
Alternative 2	All species	Beneficial impact; Minor negative impact to a few individual species requiring disturbance and where overlap may occur. May impact individuals; not likely to lead to loss of viability or a trend towards federal listing.

Rationale:

Based on the analysis of effects contained in this BE, implementation of all of the alternatives proposed, including the No Action, has some potential, however minor, to impact individuals of any given RFSS; however, this would not lead to loss of viability or trend towards federal listing. It is the nature of the *Forest Plan*, and the agency's multiple use mission, to balance the benefits derived from the Forest; however, it is also agency policy to avoid or minimize impacts to RFSS, and where impacts cannot be avoided, they may be allowed so long as such impacts do not contribute to a loss of viability or result in the need for federal listing of species (FSM 2670.32). It is also a goal of the current *Forest Plan*, as amended, to "Protect sensitive and unique species until their populations are viable" (*Forest Plan*, p. 37). "None of the action alternatives change that goal, or serves to diminish this goal – in fact, the proposed amendment and other action alternatives will indirectly strengthen our protection for most RFSS.

Efforts that protect and manage existing habitat; create and maintain additional habitat where possible, educate the public concerning the plight of TES species; search out the best information available for TES species, and collect information about TES species' use of the MNF would be considered beneficial.

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